

Exhibit D

Abortion and Mental Health

Evaluating the Evidence

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The authors evaluated empirical research addressing the relationship between induced abortion and women's mental health. Two issues were addressed: (a) the relative risks associated with abortion compared with the risks associated with its alternatives and (b) sources of variability in women's responses following abortion. This article reflects and updates the report of the American Psychological Association Task Force on Mental Health and Abortion (2008). Major methodological problems pervaded most of the research reviewed. The most rigorous studies indicated that within the United States, the relative risk of mental health problems among adult women who have a single, legal, first-trimester abortion of an unwanted pregnancy is no greater than the risk among women who deliver an unwanted pregnancy. Evidence did not support the claim that observed associations between abortion and mental health problems are caused by abortion per se as opposed to other preexisting and co-occurring risk factors. Most adult women who terminate a pregnancy do not experience mental health problems. Some women do, however. It is important that women's varied experiences of abortion be recognized, validated, and understood.

Keywords: abortion, abortion and mental health, psychological responses to abortion, emotional reactions to abortion, postabortion mental health

Supplemental materials: <http://dx.doi.org/10.1037/a0017497.supp>

In 1973, the Supreme Court of the United States legalized abortion in the landmark case of *Roe v. Wade*. Although more than 35 years have passed since this decision, it continues to generate strong emotions as well as moral and legal controversy. Over the last two decades, one aspect of this controversy has focused on the claim that abortion has negative effects on women's mental health (Bazelon, 2007; Cohen, 2006; Lee, 2003). This critical review of research conducted on the mental health consequences of abortion from 1989 to 2008 evaluates the empirical evidence for that claim. It is substantially based on, but also updates, the report of the American Psychological Association (APA) Task Force on Mental Health and Abor-

tion (TFMHA) that APA Council received on August 13, 2008.¹

Background

Public debate on the mental health implications of abortion can be traced to 1987, when then-President Ronald Reagan directed then-Surgeon General C. Everett Koop to prepare a Surgeon General's report on the public health effects (both psychological and physical) of abortion. After conducting a comprehensive review of the scientific literature, Koop declined to issue a report; instead, he sent a letter to President Reagan on January 9, 1989, in which he concluded that the available research was inadequate to support any scientific findings about the psychological consequences caused by abortion (Koop, 1989a). In subsequent testimony before Congress, Koop stated that his letter did not focus on the physical health risks of abortion because "obstetricians and gynecologists had long since concluded

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In 2006, the APA Council of Representatives established a Task Force on Mental Health and Abortion with the authors of this article as members. This article is an update of the 2008 report of that task force.

Brenda Major's contributions to this article were supported in part by grants from the American Philosophical Society and the James McKeen Cattell Foundation.

Thanks are extended to Julia Cleaver, Rennie Georgieva, and Yelena Suprunova for library assistance and to Julia Steinberg for statistical consultation.

We also thank the staff of the APA Women's Programs Office for their support: Tanya Burrwell, Shari Miles-Cohen, Leslie Cameron, Gabe Twose, Liapeng Matsau, and Ashlee Edwards.

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¹ A full copy of the 2008 report of the TFMHA is available online at <http://www.apa.org/pi/wpo/mental-health-abortion-report.pdf>

that the physical sequelae of abortion were no different than those found in women who carried to term or who had never been pregnant" (Koop, 1989b, p. 195). Koop also testified that although psychological responses following abortion can be "overwhelming to a given individual," the psychological risks following abortion were "miniscule" from a public health perspective (Koop, 1989b, p. 241).

To provide a scientifically informed assessment of research related to this important issue, the APA convened a panel of scientific experts in February 1989. The panel was charged with conducting a review of the scientific literature on psychological responses to abortion. The panel focused on empirical studies with the most rigorous research designs, reporting findings on the psychological status of women who had legal, elective, first-trimester abortions in the United States. On the basis of their review of this literature, the 1989 task force concluded that the most methodologically sound studies indicated that "severe negative reactions after legal, nonrestrictive, first-trimester abortion are rare and can best be understood in the framework of coping with a normal life stress" (Adler et al., 1990, p. 43; see also Adler et al., 1992). The task force recognized that some individual women experience severe distress or psychopathology following abortion but also noted that it was not clear that these symptoms are causally linked to the abortion.²

After publication of Koop's letter (Koop, 1989a) and unofficial draft report (Koop, 1989b) and of the 1989 task force report (Adler et al., 1990, 1992), a number of new studies were published in peer-reviewed journals that addressed the association between abortion and women's mental health. Some of these studies supported the conclusions of the 1989 task force report, whereas others challenged them. Reviewers of this emerging literature have reached differing conclusions. On the basis of their review of the post-1990 literature, for example, Bradshaw and Slade (2003) stated,

The conclusions drawn from the recent longitudinal studies looking at long-term outcomes following abortion, as compared to childbirth, mirror those of earlier reviews (e.g., Adler et al., 1992; Wilmoth, de Altiis, & Bussell, 1992), with women who have abortions doing no worse psychologically than women who give birth to wanted or unwanted children. (p. 948)

In contrast, in testimony introduced in support of a law that would have banned all abortions in South Dakota except for those in which the mother's life was in danger, Coleman (2006b) concluded that the scientific evidence shows that abortion poses significant risk to women's mental health and carries a greater risk of emotional harm than childbirth.

Recognizing the need for a critical review of the recent literature, in 2006 the Council of Representatives of APA established a new Task Force on Mental Health and Abortion composed of scientific experts in the areas of stigma, stress and coping, interpersonal violence, methodology, women's health, and reproductive health. The APA Council charged the new task force with "collecting, examining, and summarizing the scientific research address-

ing the mental health factors associated with abortion, including the psychological responses following abortion, and producing a report based upon a review of the most current research." The present article is based substantially on the report of that task force (APA TFMHA, 2008) and includes six additional papers that met inclusion criteria (identified below) but were published after the completion of the report.

In the following sections, we begin by considering questions asked and conceptual frameworks found in the research literature examining the relationship between abortion and mental health. We then address important methodological issues to consider in evaluating this literature. In this conceptual and methodological context, we then review and evaluate empirical studies published in English in peer-reviewed journals from 1989 to 2008 that compared the mental health of women who had had an elective abortion with the mental health of various comparison groups (see detailed inclusion criteria below). We selected only peer-reviewed studies in order to include only research findings that would withstand independent scrutiny by qualified scientific experts. In a following section, we review research published from 1989 to 2008 in the United States that addressed factors predicting mental health among women who had had an elective abortion. We end with a summary and conclusions based on our review.

Abortion and Mental Health: Framing the Question

The question of how abortion relates to mental health has been asked in several different ways. These differences in framing are important, as they determine the research designs necessary to address the question, the answers obtained, and the conclusions drawn. Much of the public debate over abortion and mental health has framed the question as follows: *Does abortion cause harm to women's mental health?* Both scientific and ethical considerations limit our ability to answer this question.

From a strictly scientific perspective, the best way to answer causal questions is to use a randomized experimental design with rigorously defined independent, control, and outcome variables. Such an approach, however, is not ethical when applied to options for pregnant women. It is possible to make a case for causality from prospective, longitudinal studies that rigorously establish (a) time precedence of the abortion before a mental health outcome variable, (b) covariation of abortion and the mental health outcome variable of interest, and (c) control of third variables associated with both abortion and the outcome variable so that plausible alternative explanations for any relationship observed can be ruled out. Because it is impossible

² The reader is referred to Adler et al. (1992) for a discussion of APA's involvement in abortion-related issues, the history and status of abortion in the United States, and a methodological critique of the literature on abortion prior to 1990 (see also the Fall 1992 issue of the *Journal of Social Issues*).

to rule out all possible explanations for an observed relationship, however, cause cannot be determined with certainty even with such designs.

In talking about associations between abortion and a particular mental health outcome, it is important that a "risk" not be confused with a "cause." Often people assume that if a prior history of abortion is found to be a "risk factor" for a certain outcome (e.g., depression), then a prior history of abortion is a "cause" of depression. Many things can serve as markers for causes or may be associated with causes without themselves being a part of the causal mechanisms in play. For example, age is the most important known risk factor for Alzheimer's disease (AD), but it is not the mechanism that causes people to develop AD. Rather, age is a statistical predictor in a population of who in that population is at risk, that is, more likely (older vs. younger) to develop AD. The steps that link risks and causes must be explicitly developed and demonstrated before one can validly make the assertion that removing a particular risk factor will lead to a desired outcome.

Sometimes the question of the relationship between abortion and mental health is framed in terms of prevalence, as in *What is the prevalence of clinically significant mental disorders among women who have had an abortion?* (see Wilmoth et al., 1992, for a discussion of this issue). Answering this question adequately requires a sample of women that is representative of the women to whom one wants to generalize (e.g., a nationally representative sample of women in the United States), knowledge of the prevalence of the same mental health problem among women in that population who share characteristics similar to the abortion group, and a clearly defined, agreed-upon, and valid measure of a "mental health problem." Without such information, prevalence rates are meaningless. Furthermore, even were all of the above conditions to be met, this way of framing the question overlooks the important point that if the information is to have useful policy or practical relevance, the mental health implications of abortion must be compared with the mental health implications associated with its real alternatives.

Thus, a third way of framing the question is to ask *What is the relative risk of mental health problems associated with abortion compared with the risk associated with other courses of action that might be taken by a pregnant woman in similar circumstances (i.e., facing an unwanted pregnancy)?* Once a woman is pregnant, there is no mythical state of nonpregnancy. To answer questions regarding relative risks of abortion, research designs must include a comparison group that is clearly defined and otherwise equivalent to women who have had an elective abortion. It is not appropriate to compare women who have had an abortion with women who have never been pregnant, or with women who have given birth to a wanted child. More appropriate comparison groups are comparable women who have given up a child for adoption or who are raising a child that they either initially did not want or felt emotionally, physically, or financially unable to care for. Such comparison groups control for the "wantedness" of a pregnancy.

Even the question of relative risk is problematic, however, because it (as well as the prior questions) implies that "having an abortion" is experienced similarly by all women. Abortion, however, encompasses a diversity of experiences. Women obtain abortions for a variety of reasons, at different times of gestation, via differing medical procedures. Women obtain abortions within widely different personal, social, economic, religious, and cultural contexts that influence the meaning of an abortion and how others respond to women who have abortions. Women's experiences of abortion also are shaped by their personal appraisals of pregnancy and motherhood. Questions that ask how the "typical" woman responds following a "typical" abortion mask this variability.

Thus, a fourth way of framing the relationship between abortion and mental health is to ask *What predicts individual variation in women's psychological experiences following abortion?* Why do some women experience abortion more or less favorably than others? This way of framing the question focuses on within-group variability. Research designed to answer this question does not require a comparison group of women who do not have abortions, or a nationally representative sample, although it should at minimum be prospective and longitudinal, use reliable and valid measures of mental health, and be based on samples representative of the population to which one wants to generalize.

In this review, we address the latter two questions, focusing on what the empirical literature has to say with regard to questions of relative risk and predictors of individual variability. In the next section, we briefly consider some of the sources of variability in women's experience of abortion that are important to consider.

Variability in the Abortion Experience

The vast majority of abortions are of unintended pregnancies—either mistimed pregnancies that would have been wanted at an earlier or later date or unwanted pregnancies that were not wanted at that time or at any time in the future (Henshaw, 1998; Torres & Forrest, 1988). Women terminate these pregnancies for a variety of reasons. They most frequently mention having an abortion because they are not ready to care for a child (or another child), financial constraints, concern for or responsibility to others (especially concerns related to caring for other children), desire to avoid single parenthood, relationship problems, and feeling too young or immature to raise a child (Finer, Frowirth, Dauphinee, Singh, & Moore, 2005). Some pregnancies are terminated because they are a consequence of rape or incest; very few (<1%) women cite coercion from others as a major reason for their abortion (Finer et al., 2005). Only a small percentage of abortions are of planned and wanted pregnancies. Women who terminate wanted pregnancies typically do so because of fetal anomalies or risks to their own health.

Gestational age at time of abortion varies. The vast majority (over 90%) of abortions in the United States occur in the first trimester of pregnancy (Boonstra, Gold, Richards, & Finer, 2006). In some cases, particularly those

involving teenagers, a woman may be unaware that she is pregnant until the second trimester or must go through legal proceedings (e.g., judicial bypass) in order to obtain an abortion (Boonstra et al., 2006). Later-trimester abortions also are performed after discovery of fetal abnormalities or risks to the mother's health. Abortion procedures vary as well. Although most first-trimester abortions are performed using electric vacuum aspiration, nonsurgical methods involving use of a drug or combination of drugs to terminate pregnancy (e.g., mifepristone) are increasingly being used (R. K. Jones, Zolna, Henshaw, & Finer, 2008). Procedures for abortions later than the first trimester include dilation and evacuation and induction of labor.

The experience of abortion may also vary as a function of a woman's ethnicity and culture. According to Centers for Disease Control abortion surveillance data for 2005 (Gamble et al., 2008), the abortion rate for Black women is 3.1 times the rate for White women, whereas the abortion rate for women of "other" races (Asian or Pacific Islander, American Indian, Alaska Native women) is 2.0 times the rate for White women. Black women also have abortions later in their pregnancies than do White women and women of other races. Race- and ethnicity-specific differences in legal induced-abortion ratios and rates might reflect differences among populations in socioeconomic status, access to and use of family planning and contraceptive services, contraceptive use, and incidence of unintended pregnancies. Moreover, there appears to be a strong influence of traditional African American and Latino cultural and religious values on women's use of abortion. This influence varies by age, country or area of ancestry or origin, level of acculturation, socioeconomic status, and educational and occupational attainment (Dugger, 1998; Erickson & Kaplan, 1998). Thus, moral and religious values intersect with identities conferred by race, class, or ethnicity to influence women's likelihood of obtaining an abortion and, potentially, their psychological experiences following it.

Women's experiences of abortion may also differ depending on their life cycle phase. A teenager who terminates her first pregnancy, for example, may experience psychological effects different from those of an adult woman who terminates a pregnancy after giving birth to several children.

Finally, women's experiences of abortion may vary as a function of their religious, spiritual, and moral beliefs and those of others in their immediate social context. Religiosity and religious beliefs are likely to shape women's likelihood of having an abortion as well as their responses to abortion. Women who belong to religious groups that oppose abortion on moral grounds, such as Evangelical Protestants or Catholics, may be more conflicted about terminating a pregnancy through abortion.

In summary, women's psychological experience of abortion is not uniform; rather, it varies as a function of their personal characteristics; events that lead up to the pregnancy; the circumstances of their lives and relationships at the time that a decision to terminate the pregnancy is made; the reasons for, type, and timing of the abortion;

events and conditions that occur in their lives during and subsequent to an abortion; and the larger social-political context in which abortion takes place. This variability is an important factor in understanding the psychological experiences of women who have had abortions and needs to be kept in mind when considering how best to study and explain associations found between abortion and mental health problems.

Conceptual Frameworks

Several different assumptions or perspectives have shaped understanding of potential associations between abortion and mental health outcomes. These perspectives are not necessarily mutually exclusive and are often complementary. Yet, they lead to different questions and different methodological approaches and can lead to different interpretations and conclusions.

Abortion as a Traumatic Experience

One perspective argues that abortion is a uniquely traumatic experience because it involves a human death experience, specifically, the intentional destruction of one's unborn child and the witnessing of a violent death, as well as a violation of parental instinct and responsibility, the severing of maternal attachments to the unborn child, and unacknowledged grief (e.g., Coleman, Reardon, Strahan, & Cougle, 2005; MacNair, 2005; Speckhard & Rue, 1992). The view of abortion as inherently traumatic is illustrated by the statement that "once a young woman is pregnant. . . it is a choice between having a baby or having a *traumatic experience*" (Reardon, 2007, p. 3, italics in original). The belief that women who terminate a pregnancy typically will feel grief, guilt, remorse, loss, and depression also is evident in early studies of the psychological implications of abortion, many of which were influenced by psychoanalytic theory and based on clinical case studies of patients presenting to psychiatrists for psychological problems after an abortion (see Adler et al., 1990).

Rue and Speckhard (1992; Speckhard & Rue, 1992) posited that the traumatic experience of abortion can lead to serious mental health problems, for which they coined the term *postabortion syndrome* (PAS). They conceptualized PAS as a specific form of posttraumatic stress disorder (PTSD) comparable to the symptoms experienced by Vietnam veterans, including symptoms of trauma, such as flashbacks and denial, and symptoms such as depression, grief, anger, shame, survivor guilt, and substance abuse. Speckhard (1985, 1987) developed the rationale for PAS in her doctoral dissertation, in which she interviewed 30 women specifically recruited because they deemed a prior abortion experience (occurring from 1 to 25 years previously) to have been "highly stressful." Forty-six percent of the women in her sample had second-trimester abortions, and 4% had third-trimester abortions; some had abortions when it was illegal. As noted above, this self-selected sample is not typical of U.S. women who obtain abortions. PAS is not recognized as a diagnosis in the *Diagnostic and Statistical Manual of Mental Disorders (DSM)* of the American Psychiatric Association (2002).

Abortion Within a Stress and Coping Perspective

A second perspective views abortion as a potentially stressful life event within the range of other normal life stressors. Derived from psychological theories of stress and coping (e.g., Lazarus & Folkman, 1984), this perspective emphasizes that because abortion occurs in the context of a second stressful life event—a pregnancy that is unwanted, unintended, or associated with problems in some way—it can be difficult to separate out psychological experiences associated with abortion from psychological experiences associated with other aspects of the unintended pregnancy (Adler et al., 1990, 1992). Abortion can be a way of resolving stress associated with an unwanted pregnancy and, hence, can lead to relief. However, abortion can also engender additional stress of its own.

One hallmark principle of psychological theories of stress and coping is variability. Stress is assumed to emerge from an interaction between the person and the environment (e.g., Billings & Moos, 1981; Lazarus & Folkman, 1984). From this perspective, although unwanted pregnancy and abortion can pose challenges and difficulties for an individual woman, these events will not inevitably or necessarily lead to negative psychological experiences for women. A second hallmark principle is cognitive appraisal—stress emerges from situations that the person appraises as taxing or exceeding his or her resources to cope. A woman's psychological experience of abortion will be mediated by her appraisals of the pregnancy and abortion and their significance for her life, her perceived ability to cope with those events, and the ways in which she copes with emotions subsequent to the abortion (Major, Richards, Cooper, Cozzarelli, & Zubek, 1998). These in turn are shaped by conditions of the woman's environment (e.g., age, resources, presence or absence of a supportive partner) as well as by characteristics of the woman herself (e.g., her personality, attitudes, and values). Thus, for example, a woman who regards abortion as conflicting with her own and her family's deeply held religious, spiritual, or cultural beliefs but who nonetheless decides to terminate an unplanned or unwanted pregnancy may appraise that experience as stressful more than would a woman who does not regard an abortion as in conflict with her own values or those of others in her social network.

Research derived from a stress-and-coping perspective has identified several factors that are associated with more negative psychological reactions among women who have had an abortion (for reviews, see Adler et al., 1992; Major & Cozzarelli, 1992; Major et al., 2000). The most important of these is a history of mental health problems prior to the pregnancy. Other factors associated with more negative postabortion experiences include terminating a pregnancy that is wanted or meaningful, perceived pressure from others to terminate a pregnancy, a lack of perceived social support from others, and certain personality traits that increase vulnerability to stressors (e.g., low self-esteem, a pessimistic outlook, low perceived control). It is important to note that many of these same factors are also

predictors of how women will appraise, cope with, and react psychologically to other types of stressful life events, including unwanted motherhood or relinquishment of a child for adoption. For instance, low perceived social support, low self-esteem, and pessimism also are risk factors for postpartum depression (Beck, 2001; Grote & Bledsoe, 2007; Logsdon & Usui, 2001). Consequently, the same risk factors for adverse reactions to abortion can also be risk factors for adverse reactions to its alternatives.

Abortion Occurs Within a Sociocultural Context

A third perspective emphasizes the impact of the larger social context within which pregnancy and abortion occur on women's psychological experience of these events. This approach complements a stress-and-coping perspective in that the sociocultural context affects the elements of the stress-and-coping process with regard to pregnancy and its outcomes in multiple ways that can increase or reduce the stressfulness of abortion. Unwanted pregnancy and abortion do not occur in a social vacuum. The current sociopolitical climate of the United States stigmatizes some women who have pregnancies (e.g., teenage mothers) as well as women who have abortions (Major & Gramzow, 1999). It also stigmatizes the nurses and physicians who provide abortions. From a sociocultural perspective, social practices and messages that stigmatize women who have abortions may directly contribute to negative psychological experiences postabortion.

The psychological implications of stigma are profound (see Major & O'Brien, 2005, for a review). Experimental studies have established that stigmatization can create negative cognitions, emotions, and behavioral reactions that can adversely affect social, psychological, and biological functioning. Effects of perceived stigma include cognitive and performance deficits (Steele & Aronson, 1995), increased alcohol consumption (Taylor & Jackson, 1990), social withdrawal and avoidance (Link, Struening, Rahav, Phelan, & Nuttbrock, 1997), increased depression and anxiety (Taylor, Henderson, & Jackson, 1991), and increased physiological stress responses (Blascovich, Spencer, Quinn, & Steele, 2001). Societal stigma is particularly pernicious when it leads to "internalized stigma"—the acceptance by some members of a marginalized group of the negative societal beliefs and stereotypes about themselves. Women who come to internalize stigma associated with abortion (e.g., who see themselves as tainted, flawed, or morally deficient) are likely to be particularly vulnerable to later psychological distress.

A sociocultural context that encourages women to believe that they "should" or "will" feel a particular way after an abortion can create a self-fulfilling prophecy whereby societally induced expectancies can become confirmed. Mueller and Major (1989) demonstrated that women randomly assigned to a brief counseling intervention prior to their abortion that focused on improving their self-efficacy for coping with abortion (i.e., creating positive coping expectations) were significantly less likely to display depressed affect following their abortions than were

women randomly assigned to two other control conditions. We might expect societal messages that convey the expectation that women will cope poorly with an abortion to have the reverse effect; that is, by creating negative coping expectancies, they may cause women to feel bad following an abortion.

Whether or not a particular behavior or attribute is stigmatized often varies across cultures and time (Crocker, Major, & Steele, 1998). Actions that once were viewed benignly can become stigmatized (e.g., smoking), and others that once were highly stigmatized (e.g., sex out of wedlock, divorce, cohabitation) can become less so. As society's views of a behavior change, so too will the appraisals and responses of those who engage in that behavior. Hence, the sociocultural context can shape a woman's appraisal of abortion not only at the time that she undergoes the procedure, but also long after the abortion. Social messages that encourage women to think about (reappraise) a prior abortion in more negative ways (as a sin, as killing a child) may increase women's feelings of guilt, internalized stigma, and emotional distress about an abortion they had long ago. In contrast, social messages and support groups that encourage women to cognitively reappraise an abortion in a more positive or benign way may lead to improved emotional responses (Trybulski, 2006).

Abortion Is Associated With Co-Occurring Risk Factors

A fourth conceptual framework for understanding women's postabortion mental health emphasizes systemic, social, and personal factors that are precursors to unintended pregnancy and, hence, place women at risk for having abortions and/or predispose them to experience mental health problems regardless of pregnancy and its resolution. From this perspective, mental health problems that develop after an abortion may not be caused by the procedure itself but instead may reflect other factors associated with having an unwanted pregnancy or antecedent factors unrelated either to pregnancy or abortion, such as poverty, a history of emotional problems, or intimate-partner violence. This co-occurring risk perspective emphasizes that aspects of a woman's life circumstances and psychological characteristics prior to or co-occurring with her pregnancy must be considered in order to make sense of any mental health problems observed subsequent to abortion.

Unwanted pregnancies are not random events. The lives of women who have unwanted pregnancies or abortions differ in a variety of ways from the lives of women who do not have unwanted pregnancies or abortions and do so before, during, and after pregnancy occurs. These differences may have implications for later functioning apart from any influence from the experience of unwanted pregnancy and/or abortion. Although researchers who study the consequences of nonmarital and adolescent births have long recognized the necessity of considering preexisting or co-occurring group differences (e.g., Moore, 1995), researchers who study the consequences of abortion rarely consider these differences except to control for some of

them. As described below, systemic and personal characteristics that predispose women to have unintended pregnancies also predispose them to have psychological and behavioral problems. Consequently, correlations between abortion status and mental health problems observed after an abortion may be spurious because of their joint association with similar risk factors present prior to the pregnancy.

Systemic risk factors for unplanned pregnancy and for abortion include poverty (Finer & Henshaw, 2006; R. K. Jones, Darroch, & Henshaw, 2002a, 2002b; R. K. Jones & Kost, 2007), exposure to sexual or physical abuse during childhood, and exposure to intimate-partner violence, including rape (e.g., Boyer & Fine, 1992; Dietz et al., 1999; Gazmararian et al., 1996; for reviews, see Coker, 2007; Pallitto & O'Campo, 2005; Russo & Denious, 1998b). These same systemic factors are also associated with increased risk for mental health problems. For example, studies based on nationally representative samples show that poverty is strongly related to an increased likelihood of psychiatric disorder (e.g., Kessler et al., 1994; Mather & Rivers, 2006; Messer, Kaufman, Dole, Savitz, & Laraia, 2006; Robins & Regier, 1991). Exposure to domestic (intimate) violence also is a strong and well-documented predictor of physical and mental health problems, including suicide, posttraumatic stress disorder, depression, and substance abuse (see Golding, 1999, for a meta-analysis and review). The more violence-related events a woman has experienced and the more stressful life events she has experienced in general, the greater her risk for developing a mental disorder (Breslau et al., 1998; Brown & Harris, 1978; Golding, 1999).

Personality or behavioral factors may also predispose a woman to unplanned pregnancy and abortion, as well as to mental health problems. There is substantial evidence that problem behaviors tend to co-occur among the same individuals (e.g., Costa, Jessor, & Donovan, 1987; Willoughby, Chalmers, & Busseri, 2004). One explanation (e.g., Kandel, 1989) for this pattern is that involvement in problem behaviors follows definite pathways in which specific factors place the individual who has participated in one behavior (e.g., drug use) at risk of initiating another (e.g., early sexual activity), which puts that person at risk for another event (unintended pregnancy), which in turn puts that person at risk for another event (abortion). For example, a longitudinal study based on data from the National Longitudinal Study of Youth (NLSY) showed that drug use was uniquely predictive of both subsequent premarital teen pregnancy and the decision to terminate a premarital teen pregnancy (Mensch & Kandel, 1992). Other prospective, longitudinal studies have confirmed that women who have previously engaged in problem behaviors such as smoking, using alcohol and illicit drugs, early sexual intercourse, and/or unprotected sexual intercourse are more likely than other women to subsequently have unintended pregnancies and abortions (e.g., Martino, Collins, Ellickson, & Klein, 2006).

An alternative explanation for the co-occurrence of problem behaviors is that individuals who engage in prob-

lem behaviors such as alcohol or drug use share a set of personality characteristics that predisposes them to engage in risky behaviors that increase the likelihood of other problems (e.g., unplanned pregnancy; Jessor & Jessor, 1977; see Dryfoos, 1990, for a review). For example, scoring high on a measure of "unconventionality" predicts both abortion and unplanned pregnancy (Martino et al., 2006). Personality factors that diminish the ability to regulate negative emotion also put people at risk for engaging in problem behaviors. For example, high impulsivity and an avoidance style of coping with negative emotions are risk factors for risky sexual behavior, substance use, delinquent behavior, and educational underachievement (Cooper, Wood, Orcutt, & Albino, 2003). Furthermore, longitudinal analyses show that an avoidance coping style prospectively predicts initial or increasing involvement in problem behaviors among individuals with no prior experience with that behavior (Cooper et al., 2003).

It is important to note that many of these personal characteristics that put women at risk for problem behaviors and unplanned pregnancy also put them at risk for mental or physical health problems whether or not a pregnancy is terminated or carried to term. For example, a number of studies demonstrate that using avoidant forms of coping with negative emotions is associated with poorer mental health and exacerbates adjustment difficulties over time, even after prior levels of adjustment are controlled for statistically (Aldwin & Revenson, 1987; Major et al., 1998). The best predictor of mental health problems later in life is a prior occurrence of mental health problems. For example, 50% of adolescents who had an occurrence of major depression and 90% of adolescents who experienced mania during their adolescence continued to have recurrences of these disorders in adulthood (Kessler, Avenevoli, & Merikangas, 2001).

Summary

The four frameworks summarized above are different ways of understanding the underlying causes of women's psychological experience of abortion. Only the first perspective predicts that most, if not all, women will have negative psychological experiences subsequent to abortion. The other three perspectives are complementary. The stress-and-coping perspective regards abortion as a stressful life event similar to other types of stressful life events a woman may experience. It does not rule out the possibility that some women may experience severe negative psychological experiences following abortion but locates such reactions in women's appraisals and coping processes and the personal and social factors that shape those, rather than in the nature of the event itself. The sociocultural perspective further emphasizes that women's experiences of abortion are shaped by the immediate and larger sociocultural context within which the abortion occurs. Social and cultural messages that stigmatize women who have abortions and convey the expectation that women who have abortions will feel bad may themselves engender negative psychological experiences. Social and cultural messages that normalize the abortion experience and convey expectations of

resilience, in contrast, may have the opposite effect. Finally, the co-occurring risk perspective emphasizes that unwanted pregnancy and abortion are correlated with pre-existing and/or ongoing conditions (e.g., poverty), life circumstances (e.g., exposure to violence), problem behaviors (e.g., drug use), and personality characteristics (e.g., avoidance style of coping with negative emotion) that can have profound and long-lasting negative effects on mental health. These conditions may predispose women to unintended pregnancies and abortion and have negative effects on mental health regardless of reproductive history and outcomes. From this perspective, mental health and problem behaviors observed after abortion are often a by-product of conditions and characteristics that preceded or coexist with the unintended pregnancy and abortion.

Review of Scientific Literature

Scope of Review

In the following sections we provide a review and evaluation of the empirical literature on induced abortion and mental health published between 1989 and 2008. To keep the task manageable, we imposed a number of limitations on our review. First, we limited our review to the studies examining women's mental health outcomes. Other outcomes potentially related to abortion, such as education, income, occupational status, marital status, and physical health, are beyond the scope of this review. We conceptualized mental health broadly, relying on the World Health Organization (WHO) definition of mental health as a "state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community" (Herrman, Saxena, & Moodie, 2005, p. XVIII). This review thus considers a wide array of outcomes related to mental health, including measures of psychological well-being (e.g., self-esteem, life satisfaction), emotions (e.g., relief, sadness), problem behaviors (e.g., substance abuse, child abuse), and measures of severe psychopathology.

We use the term *mental health problems* to refer to clinically significant disorders assessed with valid and reliable measures or physician diagnosis. In considering the mental health outcomes of abortion, it is crucial to distinguish between clinically significant mental disorders, such as major depression, generalized anxiety disorder, or post-traumatic stress disorder, and a normal range of negative emotions or feelings one might experience following a difficult decision, such as feelings of regret, sadness, or dysphoria. While the latter feelings may be significant, by themselves they do not constitute psychopathology. We use the term *negative psychological experiences or reactions* to refer to negative behaviors (e.g., substance use) and emotions (e.g., guilt, regret, sadness) and the term *psychological well-being* to refer to positive outcomes, such as self-esteem and life satisfaction. Because most studies published during the review period framed their research in terms of mental health problems and the negative experiences or reactions of women, this review, of necessity,

emphasized these outcomes rather than psychological well-being following abortion.

Second, we limited our review to studies examining the mental health implications of *induced* abortion. In some studies, induced termination of pregnancy is not differentiated from spontaneous termination of pregnancy (spontaneous abortion, or miscarriage). Although spontaneous abortion may have mental health consequences, we consider those consequences only when they are compared with those of induced abortion. Other terms used to indicate induced abortion include *elective abortion*, *voluntary abortion*, and *therapeutic abortion*. These distinctions can be important. Given that abortion involves a medical procedure, the term *therapeutic* would seem to apply to all abortions. However, typically the term is applied to abortions induced for medically related reasons, such as to protect the mother's health or because of severe fetal abnormalities. Almost all abortions (92% according to the 2002 National Survey of Family Growth) in the United States are of unintended pregnancies, pregnancies for which abortions are not induced for therapeutic reasons (Finer & Henshaw, 2006).

Third, we limited our core review and evaluation to studies that met the following inclusion criteria: (a) empirical research, (b) published in English, (c) in peer-reviewed journals, (d) from 1989 through 2008, (e) that measured a mental-health-relevant outcome subsequent to abortion, and (f) that included a comparison group of women. We also reviewed studies based on U.S. samples that met the above inclusion criteria but did not include a comparison group of women. Although these latter studies cannot be used to draw conclusions about the relative risks of abortion compared to its alternatives, they provide important insight into sources of variability in women's experiences of abortion in the U.S. context.

In order to identify all relevant studies, we searched the PsycINFO and Medline databases for English-language peer-reviewed articles published from 1989 through 2008 that were based on studies of human participants. Research conducted with non-U.S. as well as U.S. samples was searched. All studies that met the above criteria for inclusion were coded, summarized, and evaluated independently by at least two of the present authors, with the restriction that we not evaluate our own work (for further details on the search strategy and selection criteria see APA TFMHA, 2008).

Descriptive Overview of Literature Identified for Review

On the basis of the above inclusion criteria, we identified 58 papers based on U.S. and international samples that compared the psychological experiences of women after abortion with the psychological experiences of a comparison group of women. All papers were published between January 1989 and May 2008. In addition to the papers reviewed in the 2008 task force report (APA TFMHA, 2008), this article also reviews six papers that met the inclusion criteria specified above but were published after submission of the TFMHA report to APA (Dingle, Alati,

Clavarino, Najman, & Williams, 2008; Fergusson, Horwood, & Boden, 2008; Pedersen, 2007, 2008; Steinberg & Russo, 2008; Taft & Watson, 2008).

Two sets of papers ($n = 31$) compared women who had had an abortion with women who had a different reproductive history (e.g., a delivery, miscarriage, no pregnancy) by performing secondary analyses of public data sets or records originally collected for other purposes (Set 1 = medical records; Set 2 = other survey data): 19 of these papers were based on U.S. samples; the remaining papers were based on samples from Australia (2), New Zealand (2), Finland (6), and Norway (2). A third set of papers ($n = 21$) described original studies conducted primarily for the purpose of comparing responses of women who had had a first-trimester abortion (or an abortion of unspecified gestation) with responses of women who had a different reproductive history. Seven of these studies were conducted in the United States. Some were based on samples collected at clinics or physicians' offices; others were retrospective. A fourth set of papers ($n = 6$) consisted of studies comparing the psychological experiences of women who had had a late-trimester abortion of a pregnancy for reasons of fetal anomaly to those of another group of women. All but one of these studies were conducted on non-U.S. samples. These 58 papers are summarized in Tables 1 through 4 in the supplemental materials.

In addition, our literature search identified 23 papers based on U.S. samples that did not include a comparison group but met all other inclusion criteria. These papers are relevant to predictors of individual variation in women's mental health following abortion. These studies are summarized in Table 5 in the supplemental materials.

Methodological Concerns

Our review of the selected studies revealed that although research designs have improved in this area over the last 20 years, the majority of studies continue to be plagued by serious methodological problems. These methodological problems have been discussed at length in a number of other documents (e.g., APA TFMHA, 2008; Charles, Polis, Sridhara, & Blum, 2008; Robinson, Stotland, Russo, Lang, & Occhiogrosso, 2009). Because these methodological issues have been so well documented, we only briefly highlight them here. It is important to keep these issues in mind when evaluating the literature on postabortion mental health.

Inappropriate comparison/contrast groups.

Clearly defined and otherwise closely equivalent comparison groups are essential to address the relative risk of elective abortion compared with alternative courses of action that a pregnant woman facing an unwanted pregnancy might take. Controlling for the "wantedness" of a pregnancy is particularly important. Most studies used inappropriate comparison groups such as women who had never been pregnant, women who had given birth to a (presumably) wanted child, or women who had miscarried a (presumably) wanted child. Some researchers attempted to use covariate adjustments to try to make "nonequivalent"

groups "equivalent," but they seldom examined whether the assumptions of covariance were met.

Inadequate control for co-occurring risk factors. Because there are naturally occurring interrelations among many of the phenomena associated with elective abortion, it is essential that co-occurring risks be adequately assessed and controlled for in analyses. Otherwise, one cannot distinguish outcomes that flow from having an abortion per se from outcomes that might appear to be associated with abortion but in actuality have their origins in having an unwanted/unintended pregnancy or some other co-occurring risk that is also more highly represented in the abortion group than in the comparison group. Our literature review revealed that most studies did not adequately measure or control for co-occurring risks or confounding variables.

Sampling bias. Sampling biases can seriously undermine the generalizability of research findings. Most of the studies reviewed had one or more sampling problems. These included recruiting convenience samples of women without reporting any information necessary to establish the representativeness and generalizability of the samples, selecting samples from groups known to be biased on the outcome variable (e.g., women who belong to post-abortion support groups), and selecting subsamples for analysis from extant studies that were initially conducted for other purposes (problems associated with this practice are discussed at length in APA TFMHA, 2008).

Given our primary purpose of examining postabortion mental health of women in the United States and countries with similar sociopolitical contexts, a fourth potential sampling bias characterized studies based on samples of women in countries with more restrictive abortion laws. Restrictive laws may create sampling bias such that women who meet criteria for obtaining an abortion may be a more distressed sample prior to their abortion than women who do not meet criteria. For example, in order to obtain a legal abortion in New Zealand, a woman must obtain the approval of two specialist consultants, and the consultants must agree that either (a) the pregnancy would seriously harm the life or the physical or mental health of the woman, (b) the pregnancy is the result of incest, (c) the woman is severely mentally handicapped, or (d) a fetal abnormality exists. An abortion will also be considered on the basis of the pregnant woman's young age or when the pregnancy is the result of rape.

Inadequate measurement of reproductive history and problems of underreporting. Accurate knowledge of women's reproductive histories is essential. Many of the studies reviewed, however, had inaccurate or inadequate information regarding the women's reproductive histories, particularly their abortion histories. In a minority of studies, a woman's abortion status was verifiable (e.g., data were collected at the time that she sought an abortion at a clinic or from her medical records). More typically, however, abortion status was established by asking women to indicate on a questionnaire or to an interviewer whether or not they had had an abortion in the past. This retrospective recall approach has many prob-

lems. People are unlikely to frankly answer questions that have the potential to be embarrassing, that are overly self-disclosing, or that in other ways reflect negatively on them (e.g., Tourangeau & Yan, 2007). The percentage of women reporting an abortion on surveys is consistently lower than the percentage expected on the basis of estimates made from national provider data, sometimes markedly so (E. F. Jones & Forrest, 1992; R. K. Jones & Kost, 2007).

Underreporting of abortion in surveys is of particular concern when there is differential underreporting by subgroups of women (Fu, Darroch, Henshaw, & Kolb, 1998; E. F. Jones & Forrest, 1992). Women more likely to underreport include those who are unmarried, Black or Hispanic, Catholic, low income, and 20–24 years of age (R. K. Jones & Kost, 2007). Although underreporting can introduce systematic bias into a study, few researchers attempted to test for possible underreporting biases.

The nature of the potential bias introduced by underreporting is unclear. It is possible that women who feel most distressed by an abortion are less likely to report it; as a consequence, they may be underrepresented in the abortion group, biasing results toward underestimating negative effects. Response biases in the other direction may also occur. For example, women most willing to report one "problem" (e.g., depression, anxiety, abuse) are apt to be those most likely to report another "problem behavior" (abortion), biasing results toward overestimating negative effects. Selective recall bias occurs when individuals experiencing a disorder (a) more thoroughly scrutinize their history in an effort to explain their disorder and/or (b) more accurately recall stigmatizing events, such as abortion, than individuals not experiencing a disorder (e.g., Chouinard & Walter, 1994; Neugebauer & Ng, 1990). Recall biases can explain, for example, why a positive relationship between abortion history and breast cancer has been observed in retrospective surveys but is absent in prospective studies (see American Cancer Society website: <http://www.cancer.org/>). Specifically, compared with healthy women, breast cancer patients seeking to understand their disease are thought to be more motivated to search their memories as well as more willing to report socially stigmatizing conditions (such as abortions or sexually transmitted infections) to a health care provider, leading to a spurious relationship.

The measurement of abortion also suffered from underspecification. Many studies lacked any information about the abortion, such as length of gestation, type of procedure, or whether the abortion was performed for therapeutic reasons, and any of these factors may affect how women respond emotionally and physically after an abortion. For example, abortions performed beyond the first trimester involve a more risky medical procedure and more pain, which may have negative effects. Such abortions also occur at a more advanced stage of development, which may reflect or change the meaning of the pregnancy. Delay may also reflect ambivalence toward the pregnancy or indicate that a wanted pregnancy was terminated because of discovery of a health problem or fetal defect.

Attrition. Another methodological confound encountered was attrition—loss of cases during the course of an investigation. The consequences of attrition range from a potentially serious loss of power to biasing of results when attrition is not random and differs by group. In the case of abortion, for example, underestimation of the prevalence of distress in the final sample would occur if women who were most upset by the abortion were more likely to be lost to a follow-up than those who were retained in the sample. Similarly, overestimation of the prevalence of distress would occur if women who were least distressed by the abortion were more likely to be lost to a follow-up. Few studies tested for biases in attrition (e.g., Major et al., 2000; Pedersen, 2007).

Poor outcome measurement: Timing, source, and clinical significance. Accurate measurement of mental health outcomes is essential. Yet problems of outcome measurement were common. In some studies, claims of mental health impact (or no impact) were made on the basis of psychometrically poor measures, including one-item measures. In order to provide credible evidence of mental health impact, measures of mental health must be valid, reliable, clinically relevant, and accompanied by epidemiologically meaningful effect size indicators such as odds ratios. Absolute and relative levels of the effect should be clear. Timing of measurement also posed a problem in many studies. Some studies first contacted their participants months or years (or an unspecified time interval) after the target abortion and engaged them in retrospective reporting of their preabortion status. Retrospective reporting is subject to a large number of distortions and biases. Finally, many of the studies reviewed focused only on negative emotions or negative mental health outcomes. This can create a distorted picture of the information needed to provide complete and accurate informed consent. Assessing the clinical significance of abortion, as with any other medical procedure, requires asking “What is the benefit?” as well as “What is the harm?” of the procedure compared with relevant alternatives.

Statistical problems. Studies reviewed also were often characterized by statistical problems. One frequently encountered problem, especially in the studies based on secondary data analyses, was inflation of the probability of making a Type I error in inference by performing many significance tests at the same level one would if there were to be only a single test. This problem appeared in two forms. The first form occurred when the initial sample (often a reasonably large sample) was divided into smaller and smaller subsets, and these subsets were then used to test for differences between abortion and nonabortion cases within each subset without any overall control for the number of significance tests conducted. This practice increases the probability of a statistically significant difference occurring that is due to chance. The second form encountered was the ad hoc search for covariates without theoretical rationale or correction for chance via alpha-level control. The choice of covariates to include in analyses can play a key role in how much variance in the outcome variable is explained by pregnancy outcome.

Interpretational problems. In addition to the methodological problems described above, in many cases data were incorrectly interpreted or generalized, if not in the actual research reports themselves then in reviews, summaries, and press releases based on that research. The most frequent interpretational problem encountered was the inference of causation from correlational data. Significant correlations observed between abortion history and other variables (e.g., substance abuse, depression, higher educational outcomes) were frequently misinterpreted as evidence that abortion caused these variables to occur. Such causal claims are unwarranted, as the relationship may be spurious, the causal direction may be reversed, or the relationship may be due to an unmeasured third variable that is associated with both abortion and the outcome variable (e.g., poverty).

Summary. Most of the studies published on post-abortion mental health contained one or more of the methodological or interpretational problems discussed above. Some design problems are more serious than others if one's goal is to draw conclusions about relative risks associated with abortion compared with its alternatives. Failure to control for confounders and use of inappropriate comparison groups are especially problematic design flaws. In the following sections, we summarize and evaluate the studies. We first review the studies that included some type of comparison group. We then review and evaluate studies based on U.S. samples that did not include a comparison group.

Comparison-Group Studies Based on Medical Records and Secondary Analyses

Compared with earlier reviews (Adler et al., 1990, 1992), a major change in the scientific literature during the time period encompassed by the present review was the publication in peer-reviewed journals of 31 papers that were based on secondary analyses of publicly available data sets. Twenty-five of these papers were reviewed in the report by the 2008 APA task force; six were published subsequent to its completion. A more detailed description of these studies can be found in Tables 1 and 2 in the supplemental materials as well as in APA TFMHA (2008).

These 31 studies were of two types: (a) analyses of data based on medical records and (b) secondary analyses of data sets collected for purposes other than analyzing the relationship between pregnancy outcome and mental health. Utilizing existing data sets, particularly longitudinal data sets, has the advantage of being able to ask and answer questions without having to wait the years it takes to conduct a prospective study focused specifically on abortion. Findings based on national probability samples potentially may be generalized more widely than those based on convenience samples and may be more useful for estimating normative effects. Nonetheless, there are many serious limitations of this approach that severely constrain conclusions that can be drawn from these studies.

In the following subsections, we briefly summarize these studies and then evaluate their methodology. We begin by summarizing papers based on U.S. samples. We then turn to the papers published on samples from other countries. We focus in more depth on the most methodologically sound studies.

Analyses Based on Secondary Analyses of U.S.-Based Samples

Medical records. Four published papers were based on analyses of medical records from California's state-funded insurance program (Medi-Cal), a program that provides health care for low-income children and families. These papers are not independent of each other because the samples overlap, and most of the outcomes examined are correlated. All four Medi-Cal studies focused on an initial target pregnancy event (abortion vs. delivery) in the last half of 1989. After excluding women with subsequent abortions only from the delivery group, the researchers examined the records of the remaining sample of women for subsequent death (Reardon et al., 2002), outpatient admissions (Coleman, Reardon, Rue, & Cougle, 2002b), inpatient admissions (Reardon et al., 2003), and sleep disturbances (Reardon & Coleman, 2006). All four papers reported higher rates of negative outcomes in the abortion group compared with the delivery group (see Table 1 in the supplemental materials).

Survey data. Fifteen papers based on secondary analyses of nine U.S. data sets met inclusion criteria for our review. Six papers were based on a single data set, the National Longitudinal Survey of Youth (NLSY). The NLSY is a longitudinal national survey of a cohort of males and females who were 14–21 years old in 1979. These papers examined the relationship between abortion history and self-esteem (two studies), depression (three studies), and substance use (one study). The conclusions of researchers analyzing this single data set and even the same dependent variable varied markedly depending on sampling, coding, and analytic strategy (see Table 2 in the supplemental materials). Russo and Zierk (1992) were the first to analyze this data set for the study of abortion outcomes. They reported that self-esteem was significantly higher for women who had a single abortion than for women with no abortions or women with repeat abortions, although the relationship was extremely small. When contextual variables were controlled, however, neither having one abortion nor having repeat abortions was related to subsequent self-esteem. This finding was replicated in subgroup (i.e., Black vs. White and Catholic vs. non-Catholic) analyses of the same data, suggesting that differential underreporting of abortion by some groups did not bias study findings (Russo & Dabul, 1997).

Reardon and Cougle (2002) and Cougle, Reardon, and Coleman (2003) examined depression in the NLSY sample. The primary difference between these two papers is that the former controlled for pregnancy intention and the latter did not. Both studies reported that a larger percentage of women who had an abortion on their first pregnancy exceeded the clinical cutoff score of the Center for Epidemi-

ological Studies—Depression Scale (CES-D; Radloff, 1977) compared with women who had delivered.

Neither of the above studies, however, accurately identified first pregnancy. Using codes to properly identify first pregnancy that were provided by the NLSY staff, Schmiede and Russo (2005) reexamined depression risk for outcome of first unwanted pregnancy in the NLSY data set. In addition, they showed that the sampling strategy that Reardon and Cougle (2002) and Cougle et al. (2003) had used to control for prepregnancy psychological state (which was to include only those women who had completed the Rotter I-E scale [Rotter, 1966] in 1979 prior to their first pregnancy) resulted in excluding from the sample the women who had the highest risk for depression—those who had delivered at a younger age. When Schmiede and Russo analyzed the full sample (not restricted on the basis of I-E scores), they found no significant differences in depression between the abortion and delivery groups when race, age at first pregnancy, marital status, education, and family income were controlled. They also examined the implications of the practice of differentially excluding all women who had subsequent abortions from only the delivery group (but not from the abortion group) by comparing abortion and delivery groups with women having subsequent abortions excluded from both groups. Using the latter approach, significantly more women in the delivery group than the abortion group exceeded the CES-D cutoff score for depression.

Reardon, Coleman, and Cougle (2004) used the NLSY data set to examine self-reported substance abuse among women who had terminated a first unintended pregnancy compared with women who had delivered a first unintended pregnancy and women who had never been pregnant. After excluding women pregnant before 1980 from the sample, few significant differences were found in the large number of analyses conducted. Women in the abortion group were found to drink slightly more often than women in both other groups. They were also more likely to report using marijuana in the past 30 days than women in the delivery group (but the abortion group and the never-pregnant group were equally likely to use marijuana).

Six additional papers were based on secondary analyses of national U.S. samples. Using data from the Health of American Women Survey, Russo and Denious (2001) reported that, compared with other women, a larger percentage of women who reported an abortion also reported experiencing suicidal thoughts in the past year, having a doctor give them a diagnosis of anxiety or depression in the past 5 years, higher depressive symptoms, and lower life satisfaction. When violence history and relevant demographic and partner variables were controlled, however, abortion was no longer significantly related to any of these outcomes.

Three studies examined reproductive history and substance use. Coleman, Reardon, Rue, and Cougle (2002a) used data from the National Pregnancy and Health Survey, which was based on a national sample of pregnant women interviewed shortly after delivery in 1992. They found that among these mothers with newborns, those who reported a

history of abortion also reported higher rates of illicit drug use, marijuana use, and alcohol use than did women who were first-time mothers or had one previous live birth but who had no abortion history. Two studies examining reproductive history and substance use were based on the National Longitudinal Study of Adolescent Health (Add Health) data set, a longitudinal, nationally representative, school-based survey of adolescents. Hope, Wilder, and Terling Watt (2003) examined the relationship of pregnancy resolution (abortion vs. kept baby) to reports of having smoked cigarettes or marijuana at least 1 day in the past 30 days (both assessed with single-item measures). Prospective analyses focused on adolescent girls who became pregnant between Wave I and Wave II of the survey. These analyses excluded girls who experienced pregnancies prior to Wave I as well as those who miscarried or were still pregnant at Wave II. Adolescents in the abortion group ($n = 69$) reported higher rates of cigarette smoking and marijuana use than adolescents in the kept-baby group ($n = 87$), both prior to their pregnancy (Wave I) and subsequent to their pregnancy (Wave II). Keeping the baby was associated with a decrease in reported cigarette or marijuana use between the two waves of data collection, whereas having an abortion was not associated with a change in rates of smoking or marijuana use from Wave I to Wave II. The authors concluded that terminating a pregnancy through abortion did not increase the likelihood of delinquent behavior or substance use, whereas delivering a pregnancy decreased the likelihood of these behaviors.

Coleman (2006a) selected girls from the Add Health data set in Grades 7 through 11 who had completed both Wave I and Wave II of the survey and who reported experiencing an unwanted pregnancy that was resolved through abortion ($n = 65$) or delivery ($n = 65$). She reported that girls in the abortion group were more likely than girls who delivered to say they had used marijuana in the past 30 days, had counseling in the past year, and had trouble sleeping during the past year. The groups did not differ on alcohol use or cigarette smoking. Coleman's analyses did not control for group differences in substance use prior to the pregnancy, which Hope et al. (2003) had already shown existed in this sample.

Several studies examined anxiety as a mental health outcome variable. Cogle, Reardon, and Coleman (2005) used data from the 1995 National Survey of Family Growth (NSFG) to examine the association between outcome of first unintended pregnancy (abortion vs. delivery with no subsequent abortions) and an occurrence of "generalized anxiety" lasting more than six months among women without a history of prepregnancy anxiety. Controlling for race and age at interview, they reported that women in the abortion group were more likely to be classified as having had an episode of postpregnancy anxiety than women in the delivery group.

Steinberg and Russo (2008) reanalyzed the NSFG to examine anxiety following an unintended pregnancy, but unlike Cogle et al. (2005), they did not exclude women on the basis of prepregnancy anxiety or differentially exclude

women with subsequent abortions from the delivery group. With no covariates controlled, they too found a higher incidence of anxiety among women with unintended pregnancies in the abortion group than in the delivery group. However, when analyses controlled for prepregnancy anxiety (established by matching retrospective reports of the time of onset of anxiety and of first pregnancy), rape history, and demographics known to vary with anxiety and abortion (age at first pregnancy outcome, race, marital status, income, education, subsequent abortions, and subsequent deliveries), the relationship between abortion on the first pregnancy and subsequent anxiety symptoms was no longer significant.

In the same paper, Steinberg and Russo (2008) also analyzed data from the National Comorbidity Survey (NCS; Kessler, 2002) to examine the relation of first pregnancy outcome (abortion vs. delivery) to generalized anxiety disorder (GAD), social phobia, and PTSD diagnoses. Each was assessed with a measure based on psychiatric diagnoses of clinical disorders. Pregnancy intentionality was not assessed in this survey. Women in the abortion group did not have higher rates of GAD, social anxiety, or PTSD than women in the delivery group, with or without controlling for covariates. Further analyses showed that women who had multiple abortions were significantly more likely than women who had 0 abortions to have social anxiety and PTSD. These relationships were no longer significant, however, when history of disorder (established via retrospective reports), violence exposure, and relevant demographic variables were controlled.

Three additional papers reported secondary analyses of data based on U.S. samples from specific metropolitan areas. Coleman, Reardon, and Cogle (2005) used data from the Washington, DC, Metropolitan Area Drug Study, a sample of predominantly never married, Black, poor women, to examine self-reported drug use during pregnancy as a function of reported reproductive history. A statistically higher odds ratio for the use of legal and illegal substances during the index pregnancy was observed if the woman had reported one prior abortion compared with no abortions but not if she had reported multiple abortions compared with no abortions (with the exception of use of cigarettes during pregnancy). Coleman, Reardon, and Cogle (2005) did not control for history of drug use prior to the pregnancy or wantedness of the pregnancy, although the latter data were available in the data set.

Coleman, Maxey, Rue, and Coyle (2005) analyzed the Fertility and Contraception Among Low-Income Child Abusing and Neglecting Mothers in Baltimore, MD, 1984–1985 data set to examine the association between self-reported abortion or miscarriage/stillbirth history and child abuse and/or neglect among a sample of mothers who were receiving Aid to Families With Dependent Children. Compared with women reporting no abortions, women who reported having had one abortion (on average 6–7 years earlier) were not more likely to have been identified by Child Protective Services as a neglecting mother but were significantly more likely to have been identified as a physically abusive mother. History of multiple induced abor-

tions, however, was not related to increased risk for either abuse or neglect. Maternal history of multiple miscarriages and/or stillbirths, compared with no such history, was associated with increased risk of both child physical abuse and neglect.

Harlow, Cohen, Otto, Spiegelman, and Cramer (2004) used data from the Harvard Study of Moods and Cycles, a cross-sectional sample of women residing in the Boston metropolitan area, to examine the relationship between lifetime history of depression (established via *DSM* criteria and in-person interviews) and abortion history. Among women who reported having had one abortion, the proportion of women with a lifetime history of depression and the proportion of women with no history of depression did not differ statistically. However, women with a lifetime history of depression were significantly more likely to report having had multiple abortions before their first onset of depression than were nondepressed women, when age, age at menarche, educational attainment, and marital disruption were statistically controlled. Direct comparisons between women reporting abortion and women reporting delivery were not conducted. The researchers also reported a strong association between depression and marital disruption, which underscores the importance of controlling for marital status when seeking to assess the independent contribution of abortion to depression risk.

Evaluation of studies based on secondary analyses of U.S.-based samples. The 19 papers reviewed above are based on 10 U.S. data sets. Thus, in weighing the evidence derived from these papers, it is important to realize that the body of evidence is not as large as it appears. All of the papers based on U.S. samples had one or more methodological weaknesses that severely limit conclusions that can be drawn from them.

First, none of the papers based on U.S. samples had adequate controls for mental health prior to the pregnancy or for co-occurring risks, making it difficult to determine the cause of any observed differences between abortion groups and comparison groups, that is, whether they reflect consequences of pregnancy resolution or preexisting differences between groups. Some researchers claimed to control for prior mental health but used inappropriate measures (e.g., Reardon & Cougle, 2002). In some cases, key variables with documented relationships with both pregnancy outcome and mental health were not present in the secondary data set and hence could not be controlled (Steinberg & Russo, 2008). In other cases, key covariates that were already shown to be associated with the outcome in question and that were present in the data set were nonetheless omitted from the analyses (e.g., Coleman, 2006a; Cougle et al., 2005). For example, Reardon et al. (2004) did not control for history of drug use prior to the first pregnancy in examining the association between abortion and drug use despite the availability of this information in the data set and despite several published papers based on this same sample that linked early drug use to later reproductive outcomes, including the likelihood of having an abortion.

Few of the reports used appropriate comparison groups. Only three data sets (the NSFG, Add Health, and NLSY) included questions about the intendedness or wantedness of the pregnancy, and even when this information was available, it was not always used (e.g., Coleman, Reardon, & Cougle, 2005). Several papers compared the abortion group with a never-pregnant group or with women who had delivered a child, without controlling for the wantedness of the pregnancy. Interpretation of differences observed between the abortion and delivery groups was further compromised by differential exclusions from the delivery group (including all four studies based on the Medi-Cal data set as well as Cougle et al., 2003, 2005; Reardon & Cougle, 2002).

All of the studies had problems in the measurement of predictor and/or outcome variables. None had adequate information about the context of the abortion. With the exception of those based on medical records, all of the studies assessed abortion history retrospectively with self-reports, often without adequate measures to reduce response bias (e.g., Coleman, Reardon, & Cougle, 2005), and often of abortions that occurred many years earlier (e.g., Cougle et al., 2005; Steinberg & Russo, 2008). Some studies used single-item measures of mental health outcomes (e.g., Coleman, 2006a; Hope et al., 2003) or unvalidated measures of a psychological problem (e.g., Cougle et al., 2005). Only two studies (Harlow et al., 2004; Steinberg & Russo, 2008, NCS analyses) used psychometrically strong assessments of clinically significant outcomes (i.e., a diagnosis or diagnostic interview). Further, in some cases, it was impossible to determine whether the "outcome" variable occurred prior or subsequent to the abortion (Coleman, 2006a; Russo & Denious, 2001).

Most of the studies had sampling problems, including the use of specialized samples not representative of women in general (e.g., Coleman, Maxey, et al., 2005; Coleman et al., 2002a; Coleman, Reardon, & Cougle, 2005) and screening criteria that eliminated a large proportion of the bigger sample (e.g., all of the Medi-Cal studies). Contextual variables such as marital status that were shown in some studies to moderate results were not examined as moderators in other studies, compounding difficulties of comparing across studies.

Many studies also were characterized by statistical problems, including coding errors; selection of covariates that were based on atheoretical preliminary analyses and that often varied for unspecified reasons across analyses within the same study; performance of a large number of statistical tests without overall control for the number of significance tests; and analyses based on small subgroups or subgroups for which no sample size was provided. On the other hand, the overall large sample sizes used for some analyses meant that small effects that were statistically significant may have little clinical significance. In either case it is difficult to grasp the importance of the results without effect-size indicators.

Analyses Based on Secondary Analyses of Non-U.S.-Based Samples

Twelve papers meeting inclusion criteria reported secondary analyses of data based on data from non-U.S. samples. These included six papers based on medical records from Finland, and six papers based on analyses of longitudinal data sets—two from Australia, two from New Zealand, and two from Norway. Five of the six latter papers were published subsequent to completion of the 2008 task force report (APA TFMHA, 2008). We discuss these latter papers in more detail here because they were not summarized in the TFMHA report. See Table 2 in the supplemental materials.

Finland. Six reports were based on official health register data drawn from medical records on the entire population of Finland (Gissler, Berg, Bouvier-Colle, & Buekens, 2004a, 2004b, 2005; Gissler & Hemminki, 1999; Gissler, Hemminki, & Lonnqvist, 1996; Gissler, Kauppila, Merilainen, Toukomaa, & Hemminki, 1997). The largest and most methodologically rigorous of these (Gissler et al., 2004b) indicated that women in the abortion group had lower rates of pregnancy-related deaths (deaths occurring within one year of end of pregnancy from causes related to or aggravated by the pregnancy or its management but not from accidental or incidental causes) than women in the delivery group but higher rates of pregnancy-associated deaths (deaths occurring within one year from end of pregnancy regardless of cause of death). However, when therapeutic abortions were excluded from the category of pregnancy-associated deaths, women in the abortion group no longer had higher pregnancy-associated death rates than women in the delivery group. Women in the abortion group also had higher rates of violent pregnancy-associated deaths, and a higher proportion of their overall pregnancy-associated deaths were due to violent causes.

Australia. Two papers were based on Australian samples. Taft and Watson (2008) analyzed data from a subsample of the younger cohort of the Australian Longitudinal Study on Women's Health to examine the relationships among abortion, births, partner violence, and depression. Records for 9,683 women aged 22–27 years who had responded to mailed questionnaires in both 1996 (Time 1, or T1) and 2000 (Time 2, or T2) were examined. At T2, 30% of the sample reported having been pregnant and 11% reported having terminated a pregnancy ($N = 1,076$). Depression (defined as exceeding the cutoff score on the Center for Epidemiological Studies Short Depression Scale, or CESD-10) was positively associated both with a history of abortion (vs. no abortions) and with having two or more births (vs. no births). However, further analyses based on the 9,333 records with complete data found that these relationships became statistically nonsignificant when sociodemographic factors and exposure to partner violence were controlled. In contrast, the relationship between violence exposure and depression remained statistically significant.

Dingle, Alati, Clavarino, Najman, and Williams (2008) used data from the Mater-University of Queensland

longitudinal study of pregnancy and its outcomes (MUSP) to examine the relationship between pregnancy history and psychiatric disorders, both assessed at age 21. Potential confounds assessed in this data set included social and economic disadvantage and family instability (assessed at birth), prior problem behaviors including smoking, drinking alcohol, and anxious/depressed problems (assessed at age 14), and prior exposure to sexual violence, child sexual abuse, or rape (assessed at age 21). Women ($N = 1,223$) were divided into four groups based on pregnancy outcomes by age 21: never pregnant ($n = 943$), live birth ($n = 97$), abortion ($n = 101$), and miscarriage ($n = 82$). Six psychiatric disorders (lifetime and occurring within the previous 12 months) were assessed with the Composite International Diagnostic Interview (World Health Organization, 1992). After adjustment for potential confounding factors, women who had had an abortion had significantly higher odds of tobacco dependence and substance use disorders (except marijuana) and tended to have higher odds of affective disorders (depression and anxiety) compared with the never-pregnant group. Women in the miscarriage group also had higher odds of tobacco dependence and illicit drug use (other than marijuana) than the never-pregnant group. Dingle et al. suggested that the increased risk of alcohol and other illicit drug use disorders may have been due to pregnancy loss rather than to the experience of abortion per se.

New Zealand. Two papers were based on the New Zealand Christchurch Health and Development Study, a longitudinal study of a cohort of children (including 630 females) born in 1977 in Christchurch, New Zealand, and followed from birth to age 30. In the first of these papers, Fergusson, Horwood, and Ridder (2006) analyzed data from this cohort collected from birth to age 25. Information was obtained on (a) the self-reported reproductive history of participants from age 15 to age 25 (abortion, delivery, or never pregnant); (b) measures of *DSM-IV* mental disorders (including major depression, overanxious disorder, generalized anxiety disorder, social phobia, and simple phobia) and suicidal behavior for the intervals 15–18, 18–21, and 21–25 years; and (c) childhood, family, and related confounding factors, including measures of child abuse.

Fergusson et al. (2006) reported both concurrent and prospective analyses. The more important of these are the prospective analyses that capitalize on the longitudinal strengths of the study. The authors used reproductive history prior to age 21 years to predict total number of mental health problems experienced from 21 to 25 years (samples were too small to permit analyses by disorder). When a large number of potential confounders such as childhood social and economic disadvantage, family dysfunction, and individual adjustment problems were controlled for, the abortion group ($n = 48$) had a significantly higher number of disorders than either the delivery ($n = 77$) or never-pregnant ($n = 367$) groups, which did not differ significantly from each other.

In a second study published subsequent to release of the 2008 TFMHA report, Fergusson et al. (2008) analyzed a follow-up of the same birth cohort as above at age 30. At

each assessment from age 15 to age 30, women were questioned about their pregnancy history during the previous time interval and their initial emotional reaction to each pregnancy. At age 30, women also were asked to provide a retrospective summary of their full pregnancy history and to recall their reactions to each pregnancy, including whether it was wanted or unwanted. The authors examined the relationship of pregnancy history to the same measures of mental disorder as in their first study. Their analyses controlled for an extensive set of confounding factors, including childhood socioeconomic status, parental adjustment and family functioning, interparental violence during childhood, childhood sexual or physical abuse (assessed retrospectively at ages 18 and 21 with single-item measures), individual characteristics (child neuroticism, self-esteem, novelty seeking, conduct problems), early-onset sexual intercourse, substance use and mental health problems (both assessed at age 15), and adverse life events occurring since the previous assessment, including sexual or physical violence victimization.

Combined report data indicated that 284 women reported 686 pregnancies before age 30. These included 153 abortions (occurring to 117 women), 138 pregnancy losses ($n = 95$), 66 live births with recalled adverse reaction ($n = 52$), and 329 live births without recalled adverse reactions ($n = 197$). Because the unit of analysis was outcome and many women had more than one pregnancy, in the first set of analyses each outcome group was adjusted for the other pregnancy outcomes before being compared with the never-pregnant group ($n = 252$). The authors reported both concurrent and prospective analyses. The most informative of these are the five-year-lagged analyses, in which exposure to risks that occurred in the five years prior to the interval in which mental health was assessed was controlled and in which co-occurring risks and other pregnancy outcomes were controlled. These analyses showed that exposure to abortion was associated with a small but statistically significant increase in number of mental health problems compared with not having an abortion, particularly for anxiety disorders and alcohol and illicit drug dependence (not depression or suicidal ideation). None of the other groups (pregnancy loss, live birth with adverse reaction, and live birth without adverse reaction) showed increased rates of mental disorders, with the exception of the pregnancy-loss group, which had a higher rate of anxiety disorders than the never-pregnant group. The authors concluded that "exposure to abortion accounted for 1.5–5.5% of the overall rates of mental disorder in this cohort" (Fergusson et al., 2008, p. 449).

Norway. Pedersen (2007, 2008) published two papers based on data from the Young in Norway Longitudinal Study. In 1992 (T1) a national stratified sample of Norwegian adolescents (ages 12–18 years) was selected proportionately from schools in Norway and asked to complete a self-administered questionnaire at school. They were followed up in 1994 (T2), 1999 (T3), and 2005 (T4). The first Pedersen (2007) study examined the association between pregnancy history and substance abuse. Analyses were based on those girls who were ages 12–15 at T1 ($N =$

768). At T2, none had as yet had an abortion or given birth to a child. By T4, at average age 27, 182 had given birth, 78 had had an abortion, 47 had had both an abortion and a child, and 461 had never been pregnant. The primary outcome variables of interest were nicotine dependency, alcohol problems, and use of illegal substances during the preceding 12 months, assessed at age 27 (T4). Depression, conduct problems, smoking, alcohol intoxication, and use of other substances were assessed at T2 and T3, as were socioeconomic status, parental support, and other potential confounds.

Analyses showed that females who subsequently delivered a child or had an abortion already had higher levels of adverse family characteristics and individual risk factors at age 15 than the other groups, including higher rates of substance abuse including alcohol, nicotine, marijuana, and other illegal drugs. When the above co-occurring risk factors assessed at T1, T2, or T3 were controlled for, at T4 the abortion group had significantly higher rates of reported substance abuse in the preceding 12 months than did the nonpregnant group. Additional analyses revealed that women who still lived with the father of the aborted fetus at T4 ($n = 25$) did not have elevated substance abuse rates compared with the nonpregnant group, whereas women not in a relationship with the father ($n = 57$) had higher rates. The delivery group had lower rates of marijuana use and alcohol problems than the nonpregnant group.

In the second study, Pedersen (2008) examined the association of pregnancy history and depression. Depression was measured with the six-item Kandel and Davies (1982) Depressive Mood Inventory administered at T2, T3 and T4; a cutoff score was used to determine prevalence of depression. A first prospective analysis examined the percentage of women who exceeded the cutoff score for depression at age 20 (T3) among women who had had an abortion ($n = 40$), had had a live birth ($n = 27$), or had not been pregnant in their teens (approximately 700). Adjusting for prior depression as well as other potential confounders assessed at T2 including demographic, family-related, and individual covariates, Pedersen found that the percentage who exceeded the cutoff for depression did not differ between women who had had an abortion or live birth and women who had not been pregnant.

A second set of analyses examined depression at age 27 (T4). By T4, 30% of the women had given birth ($n = 232$) and 16% ($n = 125$) had had an abortion. Women in each birth outcome group were subdivided into those for whom the outcome had occurred at ages 15 to 20 and those for whom it had occurred at ages 21 to 26. After adjusting for prior depression (assessed at T3) as well as other significant covariates, Pedersen (2008) found no differences in rates of depression at age 27 between women who reported having an abortion or live birth in their teens and women who had not been pregnant. The number of women who exceeded the cutoff score for depression was small in each case (n s = 5, 8, and 44 for the abortion, live-birth, and never-pregnant groups, respectively). In contrast, women who reported having had an abortion in their mid-twenties had significantly higher rates of depression than women

who had not been pregnant, whereas women who reported having a child in their mid-twenties did not. Again, the actual numbers of women exceeding the cutoff scores for depression were small ($n = 21$ in both the abortion and live-birth groups). Pedersen reported that neither number of abortions nor presence of a live-in partner was a predictor of depression at age 27 but did not report details on these analyses.

Evaluation of studies based on secondary analyses of non-U.S.-based samples. Because they are based on official health register data drawn from the entire population of Finland, the Finnish medical record studies do not suffer from as many methodological inadequacies as the U.S. MediCal studies. Nonetheless, because these studies have no data about the context of women's lives or the measurement of co-occurring risks, such as prior mental health, life circumstances, or prior exposure to violence, these studies are uninformative about relative risks associated with abortion *per se*.

The six papers based on secondary analyses of data from non-U.S. samples are generally stronger than the studies based on secondary analyses of U.S. samples reviewed earlier. All are based on longitudinal studies, some conducted over long periods of time (although some assessed pregnancy history and mental health outcomes concurrently). All used validated measures of mental health outcomes. All included controls for a number of potential confounding factors that could contribute to an observed relationship between abortion and mental health. Several included measures of prior exposure to violence, including intimate partner violence, sexual violence, childhood sexual or physical abuse, rape, and/or victimization (Dingle et al., 2008; Fergusson et al., 2008; Taft & Watson, 2008). Notably, the studies based in New Zealand and Norway (Fergusson et al., 2006, 2008; Pedersen, 2007, 2008) also assessed the mental health outcomes under investigation years prior to the abortion as well as subsequent to it, thereby providing a better control for prior mental health. These studies also reported high retention rates, a relatively small rate of underreporting of abortion, and analyses to consider the impact of attrition and underreporting.

Despite these strengths, these six papers also have limitations that temper inferences that can be drawn from them. Most important, none of these studies had detailed contextual information relevant to the decision to have an abortion, such as information about the wantedness or intendedness of the pregnancy or reasons for the abortion. Several of the studies used a never-pregnant group as the comparison group (Fergusson et al., 2006; Pedersen, 2007). Fergusson et al. (2008) attempted to address this limitation by analyzing as a separate group women who retrospectively reported that a pregnancy had not initially been wanted and/or was distressing and comparing their mental health to that of women who had never been pregnant. The retrospective nature of this reporting, however, raises concerns about its accuracy.

Second, all of the studies were based on retrospective recall of abortion history, sometimes assessed concurrently with mental health outcomes (e.g., Taft & Watson, 2008).

Third, with one exception (Pedersen, 2008), these studies did not examine mental health among women with multiple abortions separately from mental health among women with a single abortion, potentially biasing the results. In Fergusson et al. (2006), 21.6% of the abortion group had had more than one abortion³; in Fergusson et al. (2008), it appears that approximately 24% of the women in the abortion group had had multiple abortions. Fourth, all of these studies were based on samples of young women—women who reported terminating a pregnancy in their twenties or earlier. The results may not generalize to older women or women of all ages. Fifth, although the initial samples on which these studies were based were large, the size of the abortion samples in the critical prospective analyses were typically small, ranging from 48 (Fergusson et al., 2006) to 125 (Pedersen, 2008). The exception was Taft and Watson (2008), $n = 1,076$.

It is also important to consider that because these studies were conducted in different sociocultural contexts than that in the United States, their findings may not generalize to the U.S. context. The more restrictive abortion regulations in New Zealand and South Australia compared with the United States introduce potential sampling bias into those studies. Norway has liberal abortion laws that are more similar to those of the United States.

Comparison-Group Studies Based on Primary Data

Seventeen studies were conducted between 1989 and 2008 with the primary purpose of comparing women who had had a first-trimester abortion (or an abortion in which trimester was unspecified) with a comparison group of other women on a mental-health-related variable. These studies resulted in 20 published papers. Details, key findings, and limitations of these studies are summarized in Table 3 in the supplemental materials.

Description of Findings From U.S. Samples

Seven studies were based on samples that are largely or exclusively U.S. based. Cohan, Dunkel-Schetter, and Lydon (1993) examined responses of 33 women one month following a pregnancy test, 21 of whom had terminated their pregnancy and 12 of whom had continued their pregnancy. Almost all had reported that their pregnancy was unintended. There were no statistically significant differences between the women who had terminated their pregnancy and the women who had continued their pregnancy on any of the outcomes assessed (positive and negative emotions and decision satisfaction).

A prospective study by Lydon, Dunkel-Schetter, Cohan, and Pierce (1996) interviewed women just prior to obtaining results of a pregnancy test at health clinics in the United States and Canada, as well as 9 days and 4–7 weeks (T3) after receiving a positive test result. Prior to learning whether or not they were pregnant, the more women re-

³ David Fergusson, personal communication to Nancy Felipe Russo, August 8, 2007.

ported that a possible pregnancy was intended and meaningful, the more committed they felt toward it and the more positive and less negative emotion they expressed. Not surprisingly, those who felt more committed toward a pregnancy were more likely to continue their pregnancy. Among women continuing their pregnancy ($n = 25$), emotional responses at T3 did not differ as a function of initial commitment. Both those high in initial commitment and those low in initial commitment expressed more positive than negative emotions 4–7 weeks after learning they were pregnant. Emotional responses of women who had aborted their pregnancy ($n = 30$) differed as a function of initial commitment to a possible pregnancy. Those who had initially been relatively higher in commitment expressed more negative and less positive emotion than those who had been lower in initial commitment. The latter group expressed more positive than negative emotions at T3 and did not differ significantly from those who continued their pregnancy.

The remaining five U.S. studies measured abortion history through retrospective self-reporting. Felton, Parsons, and Hassell (1998) found no statistically significant differences on overall health-promoting behaviors, appraisals of problem-solving effectiveness, or global self-image between 26 adolescents attending a family planning clinic who reported a history of abortion and 26 demographically matched adolescents who reported never being pregnant. Williams (2001) found no statistically significant differences on subscales of the Grief Experience Inventory between 45 women waiting to see their health care provider who reported a history of abortion and 48 demographically similar women who reported no elective abortions. Medora, Goldstein, and von der Hellen (1993) found that among a sample of 121 single, never-married, pregnant teenagers, the 28 girls who reported a prior abortion had significantly higher self-esteem than the 93 girls who reported no abortion history. Medora and von der Hellen (1997) reported that among a sample of 94 teen mothers, teens who reported a prior abortion did not differ in self-esteem from teens who did not report an abortion (number in each group was not specified). The only U.S. study to report that an abortion group had a poorer outcome than a comparison group was conducted by Reardon and Ney (2000). This study was based on a reproductive history questionnaire mailed to the homes of a large sample of women, only 14.2% of whom responded. In analyses restricted to White women, women who reported having had at least one induced abortion ($N = 137$) were more likely than women who reported having had no abortions ($N = 395$) to also agree with a single yes/no question: "Have you ever abused drugs or alcohol?"

Description of Findings From Non-U.S. Samples

Fourteen studies were based on samples composed mainly of non-U.S. women. Most were methodologically quite poor. The most methodologically sound were four papers based on a study conducted by Broen and colleagues in Norway (Broen, Moum, Bodtker, & Ekeberg, 2004, 2005a,

2005b, 2006) and one paper based on a study conducted jointly by the Royal College of General Practitioners and the Royal College of Obstetricians and Gynecologists in the United Kingdom (Gilchrist, Hannaford, Frank, & Kay, 1995).

The research by Broen and colleagues followed two groups of Norwegian women from 10 days to 5 years after a first-trimester induced abortion ($N = 80$) or early miscarriage (< 17 weeks; $N = 40$). Comparisons between the miscarriage and induced-abortion groups, with potential confounders controlled for, revealed no significant differences in anxiety, depression, or subjective well-being at any time point. Women who had had an induced abortion reported feeling more guilt, shame, and relief and also more avoidance on the Impact of Events Scale (Horowitz, Wilner, & Alvarez, 1979) than women who miscarried. Women who miscarried reported more feelings of grief and loss than those who had an induced abortion in the short term, but this difference disappeared by five years postevent.

The strongest study reviewed of this variety was prospective and longitudinal and had a large sample size, appropriate comparison groups of women with unplanned pregnancies, and a long postpregnancy/abortion follow-up time (Gilchrist et al., 1995). It is important to note that this study also controlled for mental health prior to the pregnancy as well as other covariates. The final sample consisted of four pregnancy outcome comparison groups: (a) 6,410 women who obtained terminations (85% occurred before 12 weeks of gestation), (b) 6,151 women who did not seek termination, (c) 379 women who requested termination but were denied, and (d) 321 women who requested termination but changed their minds. Postdelivery/abortion psychiatric morbidity was assessed using established diagnoses and grouped into three categories based on order of severity: (a) psychosis, (b) nonpsychotic illness (e.g., depression, anxiety), and (c) deliberate self-harm (DSH) without other psychiatric illness (primarily drug overdoses). Similarly, prepregnancy psychiatric history was classified into four categories of order of severity: (a) psychotic episode, (b) nonpsychotic illness, (c) DSH without other psychiatric illness, and (d) no psychiatric illness. The two largest subgroups of prepregnancy history consisted of women with no prepregnancy history of psychiatric problems or DSH prior to the pregnancy (2,476 women) and women with a history of nonpsychotic illness (1,100 women); these were followed by women with a history of psychosis ($N = 106$) and women with a history of DSH alone ($N = 36$). Differences between the delivery reference group and each of the other three comparison groups were examined within each of the four categories of prepregnancy psychiatric history. Age, marital status, smoking, education level, gravidity, and prior history of abortion were controlled in analyses that focused on the overall rate of postpregnancy psychiatric morbidity as well as the rate of each of the three postpregnancy diagnoses among the four comparison groups.

Among women with equivalent past psychiatric histories, there were no statistically significant differences

between the four comparison groups in overall rates of psychiatric illness. Rates of specific postpregnancy psychiatric illnesses, however, differed among the comparison groups depending on prepregnancy diagnostic history and diagnostic outcome as follows:

1. With respect to postpregnancy nonpsychotic illness, no statistically significant differences were found between abortion and delivery groups, irrespective of prepregnancy diagnostic history.

2. With respect to postpregnancy psychoses, women who had had an abortion were significantly less likely to have a postpregnancy psychotic episode than were those who delivered among the subgroup of women with no prepregnancy history of psychotic illness (1.1 vs. 4.1) and among the subgroup of women with a history of nonpsychotic illness (4.9 vs. 11.8). A similar, but nonsignificant, pattern was observed among the subgroup of women with a history of psychosis (28.2 vs. 35.2).

3. Findings with regard to the outcome of DSH were mixed. Rates of DSH did not significantly differ for abortion versus delivery groups among the categories with the highest DSH rates—women with a past history of psychosis (18.2 vs. 19.3) or past history of DSH (8.4 vs. 13.5). Among women with no previous psychiatric history, however, DSH was significantly higher among women who were refused an abortion (5.1) or who had had an abortion (3.0) than among those who delivered (1.8). Most DSH episodes (89%) were drug overdoses; none were fatal.

In sum, Gilchrist et al. (1995) concluded, "Rates of total reported psychiatric disorder were no higher after termination of pregnancy than after childbirth" (p. 243). Further, they noted that women with a history of previous psychiatric illness were most at risk irrespective of the pregnancy outcome.

In addition to the papers described above, there were 8 additional studies in this set. Owing to their numerous design and analytic flaws, however, we do not describe them further here (see Table 3 in the supplemental materials).

Evaluation of Primary Data Comparison-Group Studies

The many methodological problems found in the majority of these reports limit conclusions that can be drawn from them. Below, we briefly summarize the nature of these problems.

Inappropriate comparison groups. With two exceptions (Cohan et al., 1993; Gilchrist et al., 1995), none of these studies used a comparison group that controlled for the occurrence of an unintended or unwanted pregnancy, and hence they were unable to adequately address the question of relative risk. Comparison groups used included women who reported never being pregnant (Felton et al., 1998), women who were currently pregnant (Bailey et al., 2001; Lydon et al., 1996; Medora et al., 1993; Teichman, Shenhar, & Segal, 1993), women who were not currently pregnant (Bradshaw & Slade, 2005; Teichman et al., 1993), women who reported no elective abortions (Conklin & O'Connor, 1995; Medora et al.,

1993; Reardon & Ney, 2000; Williams, 2001), women who had miscarried (Bailey et al., 2001; Broen et al., 2004, 2005a, 2006), women who had participated in a previous public health survey (Lauzon, Roger-Achim, Achim, & Boyer 2000), and women matched on demographic variables (Barnett, Freudenburg, & Wille, 1992).

Inadequate control for co-occurring risk factors. Just as important as the lack of appropriate comparison groups was the absence of measures of mental health and other variables prior to the pregnancy or abortion that were likely to be related to the outcome studied (e.g., prior engagement in problem behaviors). Hence, any between-groups differences observed postabortion may reflect between-groups differences that were present prior to the pregnancy and/or abortion. With one exception (Gilchrist et al., 1995), none of the studies had adequate measures of preabortion mental health and thus could not separate problems observed postabortion from those that were present prepregnancy. Furthermore, few of the studies controlled for important covariates, such as age, marital status, number of children, race, education, and duration of partnership, that might be related to outcome variables independently of abortion history.

Sampling problems. Most studies were based on small sample sizes (fewer than 100 women). Many provided little or no information about the sample recruitment strategy, response rates, or sample representativeness or were based on a sample that clearly is not representative of the population of women who obtain abortions (e.g., Reardon & Ney, 2000). Only six of these studies were conducted exclusively in the United States, raising concerns about generalizability in the context of public policy in the United States. The rest were conducted in Canada (3), the United Kingdom (3), Norway (1), Germany (1), Israel (1), and Brazil (1). The abortion regulations and sociocultural context of abortion in some of these countries differ in important ways from those of the United States. For example, in some countries where abortion is legal, such as Britain, all abortions must be approved by two physicians, usually on grounds that continuation of a pregnancy involves greater risk to the woman's physical or mental health than does termination (although such requirements may be more of a formality than a barrier).⁴ In Brazil, induced abortion is illegal except in cases where the pregnancy is dangerous to the mother's health or resulted from rape or incest.

Measurement problems. In six of the papers, the key event—abortion—was determined from retrospective self-report, with no checks on accuracy of reporting and no information on how long since the abortion occurred, whether the pregnancy was wanted or not, whether the abortion was first or second trimester, or what the age of the woman was at the time of the abortion (Conklin & O'Connor, 1995; Felton et al., 1998; Medora et al., 1993; Ney, Fung, Wickett, & Beaman-Dodd, 1994; Reardon & Ney, 2000; Williams, 2001). Retrospective self-reports are

⁴ Ellie Lee, personal communication, February 2007.

notoriously unreliable and subject to bias. In studies where abortion was verified, mental health outcomes were often assessed within only a few weeks or months after the abortion. Only two studies assessed mental health outcomes more than a year postabortion (Broen et al., 2006; Gilchrist et al., 1995).

In several cases, a single item of unknown reliability was used as a measure of mental health (Ney et al., 1994; Reardon & Ney, 2000). Only one study assessed clinically significant outcomes, that is, whether participants met diagnostic levels for psychological disorder or had sought psychiatric treatment (Gilchrist et al., 1995). The remainder focused on mental-health-related outcomes such as self-esteem, positive and negative affect, decision satisfaction, life satisfaction, self-reported health-promoting behaviors, relationship quality, sexual attitudes and problems, grief, anxiety or depressive symptoms, and stress responses.

Statistical problems. Statistical problems included conducting numerous analyses capitalizing on chance (e.g., Reardon & Ney, 2000), using small sample sizes lacking sufficient power to detect potentially meaningful differences (e.g., Cohan et al., 1993), failing to report sample sizes at all (Ney et al., 1994), or reporting no statistical tests of comparisons on postabortion measures but discussing results as if such tests had been reported (e.g., Lauzon et al., 2000). Effect size indicators were rarely included in these studies.

Studies of Abortion for Reasons of Fetal Abnormality

All of the studies reviewed thus far either were restricted to samples of women undergoing first-trimester abortions or did not differentiate first-trimester from later-trimester abortions. The vast majority of abortions in the United States are of unplanned pregnancies that are either mistimed or unwanted (Finer & Henshaw, 2006), and they occur in the first trimester (Boonstra et al., 2006). However, the increasing accessibility and use of ultrasound technology and other prenatal screening techniques have increased the likelihood of prenatal diagnosis of fetal anomalies, often in the second and sometimes even in the third trimester. Following such a diagnosis, many couples now elect to terminate their pregnancy, especially when informed that the fetal anomaly is lethal or severely disabling (see Statham, 2002, for a review of research in this area).

Abortion under these circumstances is a very different physical and psychological event than an abortion of an unplanned or unwanted pregnancy. Not only does abortion for reasons of fetal anomaly typically occur later in pregnancy but, more important, it usually occurs in the context of a pregnancy that was initially planned and wanted. Consequently, the meaning and significance of the pregnancy and abortion are apt to be quite different, as is the extent of loss experienced. A full understanding of this complex experience requires comparing responses of women who undergo induced termination of a pregnancy because of a fetal anomaly with responses of women who experience a miscarriage of a wanted pregnancy, experi-

ence a neonatal loss (e.g., a stillbirth or death of a newborn), or deliver a child with severe physical or mental disabilities.

Our literature search identified five studies in which women who terminated an initially wanted pregnancy because of fetal anomaly were compared with one or more of these groups of women. All were based on non-U.S. samples: Germany (Kersting et al., 2005; Lorenzen & Holzgreve 1995), Norway (Salvesen, Oyen, Schmidt, Malt, & Eik-Nes, 1997), and the United Kingdom (Iles & Gath, 1993; Rona, Smeeton, Beech, Barnett, & Sharland, 1998). We also identified one U.S. study that examined psychological experiences among women who terminated an initially wanted pregnancy because of fetal anomaly, but the study did not include a contrast group (Zeanah, Dailey, Rosenblatt, & Saller, 1993). Findings of these studies are discussed in the 2008 task force report (APA TFMHA, 2008) and summarized in Table 4 in the supplemental materials. All of these studies are limited by high attrition rates, typically low response rates, and extremely small sample sizes. In most studies, the sample also was of unknown representativeness. Despite these methodological limitations, these studies tell a fairly consistent story. Women's levels of negative psychological experiences subsequent to a second-trimester abortion of a wanted pregnancy for fetal anomalies were not different from those of women who experienced a second-trimester miscarriage (Iles & Gath, 1993) or perinatal loss (Salveson et al., 1997; Zeanah et al., 1993). As might be expected, their levels of distress were higher than those of women who delivered a healthy child (Kersting et al., 2005; Rona et al., 1998).

Abortion-Only Studies

In addition to the primary research reviewed above, our literature search also identified a set of papers that met all inclusion criteria except that they did not include comparison groups. Although these studies do not address questions of relative risk, they are useful for identifying sources of individual variation in women's psychological experiences following abortion. Because cultural contexts surrounding abortion and abortion regulations differ greatly across countries, however, generalizing to U.S. samples from studies of this type that are based on non-U.S. samples is problematic. Hence, we review below only the 23 non-comparison-group studies that met inclusion criteria that were based on U.S. samples. These studies are summarized in Table 5 in the supplemental materials. The studies reviewed were of two major types: (a) prospective or concurrent studies that usually included preabortion measures of psychological adjustment and risk factors and one or more postabortion assessments of adjustment and (b) retrospective studies that assessed women's perceived reactions to the event and current level of psychological functioning several years after the abortion. The retrospective studies have serious methodological problems that negate their ability to answer questions about psychological experiences following abortion.

Prospective Studies

The majority of prospective studies published since 1989 were conducted by one group of investigators. Seven papers were based on data from a multisite sample of first-trimester abortion patients in the Buffalo, New York, area. Four of the papers based on this sample (Sample 1) analyzed data of 442 women followed for two years after a first-trimester abortion for an unintended pregnancy at one of three sites (Cozzarelli, Major, Karrasch, & Fuegen, 2000; Major et al., 2000; Major & Gramzow, 1999; Quinton, Major & Richards, 2001). Assessments took place at four time points: preabortion and one hour, one month, and two years postabortion. The three other papers based on Sample 1 did not include the two-year follow-up in their analyses (Cozzarelli, Sumer, & Major, 1998; Major et al., 1998; Major, Zubek, Cooper, Cozzarelli, & Richards, 1997). These seven papers are not independent of each other because they are based on the same sample.

Four additional papers by Major and colleagues were based on three different samples of women obtaining first-trimester abortions. These included samples of 291 (Sample 2: Cozzarelli, 1993; Cozzarelli & Major, 1994), 283 (Sample 3: Major et al., 1990), and 247 (Sample 4: Major, Cozzarelli, Testa, & Mueller, 1992) women recruited from a single abortion facility in the Buffalo, New York, area who provided preabortion and 30-minute and one-month postabortion follow-up data.

Analyses based on the Sample 1 data set examined changes over time in women's psychological experiences of their abortion. Most women reported that they had benefited from their abortion more than they had been harmed by it, and these appraisals did not change from one month to two years postabortion (Major et al., 2000). Most women also reported that they were satisfied with their decision, although the percentage satisfied decreased from one month (79%) to two years (72%) postabortion. Women also reported feeling more relief than positive or negative emotions both immediately and two years after their abortion. Over the two years, however, relief and positive emotions declined, whereas negative emotions increased. The level of depression scores was lower and self-esteem was higher two years after the abortion compared with just prior to the abortion (Major et al., 2000).

Women at higher risk for negative emotions two years postabortion included those with a prior history of mental health problems (Major et al., 2000), those younger in age at the time of the abortion (Major et al., 2000), those with low perceived or anticipated social support for their decision (Cozzarelli et al., 1998; Major et al., 1997), those with greater personal conflict about abortion (Cozzarelli et al., 2000), and those with low self-efficacy about their ability to cope with the abortion (Cozzarelli, 1993; Cozzarelli et al., 1998; Major et al., 1990).

Two studies investigated the effects of antiabortion picketing on women's postabortion responses. Cozzarelli and Major (1994, Sample 2) found that the greater the number of antiabortion picketers and the more aggressive the picketing that women encountered when entering an

abortion clinic (as coded by observers), and the more the women reported feeling upset by the demonstrators, the more depressed affect they reported right after their abortion. These effects were partially mitigated by the presence of prochoice escorts outside the clinic, suggesting that prochoice escorts altered not only the social context, but also the meaning of that context. A later study that included two-year follow-up assessments concluded that the women's encounters with picketers evoked short-term negative psychological reactions but did not appear to have long-term negative psychological effects (Cozzarelli et al., 2000; Sample 1).

Examination of perceived stigma revealed that almost half of the 442 women in the multisite sample (Sample 1) felt that they would be stigmatized if others knew about the abortion, and over 45% felt a need to keep it secret from family and friends (Major & Gramzow, 1999). The more women felt that others would look down on them if they knew about their abortion, the more they felt that they had to keep the abortion a secret from their friends or family. Perceived need for secrecy, in turn, was associated with less disclosure of feelings to family and friends, increased thought suppression and intrusion, and increased psychological distress two years postabortion (controlling for initial distress). Thus, feelings of stigmatization led women to engage in coping strategies that were associated with poorer adjustment over time.

This research group also extended earlier knowledge about the role of social support in abortion. One study (Sample 1) showed that perceived social support mediated the relationship between attachment style (internal working models of self and others) and adjustment (Cozzarelli et al., 1998). Another paper also based on Sample 1 investigated the joint and interactive effects of perceived social conflict and perceived social support from others regarding the abortion on negative psychological reactions and well-being (Major et al., 1997). Greater perceived conflict with the partner predicted increased distress (but not decreased well-being), whereas greater perceived support from the partner predicted increased well-being (but not decreased distress). Moreover, for mothers and friends, perceived support directly predicted well-being, whereas it interacted with perceived conflict to predict distress.

Three studies established the importance of cognitive appraisals and self-efficacy as proximal predictors of post-abortion adjustment. One study showed that women who perceived more social support from others for their decision felt more able to cope with their abortion prior to the procedure, and these pre-procedure self-efficacy appraisals mediated the positive relationship between perceived social support and postabortion well-being (Major et al., 1990, Sample 3). Two other studies showed that self-efficacy appraisals prior to the abortion mediated the effects of preabortion personal resources on postabortion coping and adjustment (Cozzarelli, 1993, Sample 2; Major et al., 1998, Sample 1). Prior to the procedure, women with more resilient personalities (high self-esteem, internal locus of control, and an optimistic outlook on life) felt more capable of coping with their abortion and appraised it more benignly.

Their more positive cognitive appraisals, in turn, were associated with more adaptive forms of coping in the month following the abortion (more acceptance, less avoidance), which in turn were associated with reductions in psychological distress (depression, anxiety) and increases in positive well-being over time.

Two studies that specifically compared the responses of minor adolescents and adult abortion patients reported very similar findings. Using data from Sample 1 of Major et al. (2000), Quinton, Major, and Richards (2001) found no differences between minors ($N = 38$) and adults ($N = 404$) in psychological distress and well-being two years after an abortion, although the adolescents were slightly less satisfied with their decision and perceived less personal benefit from it. In a different sample of 96 women (23 minors), Pope, Adler, and Tschann (2001) reported that at four weeks postabortion, there were no differences in depression, anxiety, self-esteem, or posttraumatic stress between the younger and older groups, although the minors scored slightly lower on "comfort with decision." Both of these studies are limited by small samples of adolescents. These results appear to conflict with the Major et al. (2000) analysis of Sample 1 data that identified younger age at time of abortion as a risk factor for negative postabortion emotional experiences. Differences are likely due to the fact that the latter study examined the association of mental health outcomes with the continuous variable of age among a larger sample.

Three other prospective studies examined emotional responses after mifepristone abortions in minors (Phelps, Schaff, & Fielding, 2001), depression risk after surgical and nonsurgical abortion (Sit, Rothschild, Creinin, Hanusa, & Wisner, 2007), and depression and grief among women who terminated a desired pregnancy during the second trimester via either dilation and evacuation or induction of labor (Burgoine et al., 2005). Findings of these studies are consistent with several others based on non-U.S. samples in suggesting that method of termination does not affect emotional adjustment or psychological experiences after the procedure among women given a choice of procedure (Ashok et al., 2005; Howie, Henshaw, Naji, Russell, & Templeton, 1997; Lowenstein et al., 2006).

Retrospective Studies

Most of the half dozen retrospective studies of abortion samples had serious methodological flaws and do not warrant further detailed descriptions here. In these studies, women's current or recalled past mental health or distress often was attributed to an abortion that occurred many years previously (e.g., Franz & Reardon, 1992; Lemkau, 1991; Tamburrino et al., 1990). For instance, Lemkau (1991) queried women about their level of distress experienced three months postabortion although the target abortion had occurred an average of nine years previously. Authors of several papers drew conclusions about prevalence of postabortion mental health problems in the general population from samples of women who had self-identified as having postabortion mental health problems, attributed their psychological problems to having had an abortion,

and were members of support groups that foster such attributions (Congleton & Calhoun, 1993; Franz & Reardon, 1992; Tamburrino et al., 1990).

Evaluation of Abortion-Only Studies

As a group, the studies by Major and colleagues that are based on Sample 1 have a number of methodological strengths, including use of standardized measures of psychological experiences, appropriate data collection and analysis procedures, a large sample, two-year postabortion follow-up, analyses of changes in abortion reactions over time, and sound social-psychological theory to direct analyses. The studies also have several limitations, including no measures of mental health obtained prior to the pregnancy, no measures of prior exposure to violence or abuse, and lack of detailed information on the reasons for the abortion. Another potential limitation is the attrition rate; the 442 women for whom data were available two years postabortion represented 50% of the original sample. The researchers conducted detailed analyses to determine whether women who were lost to follow-up differed in any way from those who completed. They did not. No statistically significant differences were observed on any baseline demographic or psychological characteristic, suggesting that attrition did not result in sampling bias. Strengths and limitations of Samples 2, 3, and 4 are similar to those of Sample 1, with the added caveat that these were smaller samples from a single site followed for a shorter time period. Collectively, these studies clarify important social and individual factors that predict women's psychological experiences subsequent to abortion and illustrate the importance of appraisals and coping processes in predicting women's postabortion adjustment.

The remaining prospective studies were limited by a variety of methodological problems that included small samples, high and unanalyzed attrition rates, lack of specification of abortion history, single-item measures of psychological reactions, and nonrepresentative samples. Some assessed the emotional impact of the abortion retrospectively (Miller, 1992). All of the retrospective studies in this group suffered from methodological limitations that decreased confidence in the results and limited conclusions that could be drawn from them, including use of one-item unstandardized outcome measures (Coleman & Nelson, 1998; Franz & Reardon, 1992), small sample sizes (Coleman & Nelson, 1998; Congleton & Calhoun, 1993; Tamburrino et al., 1990), and biased samples (Congleton & Calhoun, 1993; Franz & Reardon, 1992; Tamburrino et al., 1990).

Summary and Conclusions

Summary

In this article, we reviewed and evaluated empirical research addressing the relationship between induced abortion and mental health. As noted at the beginning of this article, how researchers frame this question shapes the findings that are obtained and how they are interpreted. Too often, the question is framed in a way that implies that

abortion is a unitary event, experienced similarly by all women. Abortion, however, encompasses a diversity of experiences, and women vary significantly in how they react to this life event. Understanding the personal, social, and cultural sources of this variability is important if we are to fully appreciate how abortion affects women's mental health. Understanding the mental health implications of abortion also requires that we compare psychological responses associated with abortion with psychological responses *associated with its real alternatives*—other courses of action that might be taken by a pregnant woman in similar circumstances (i.e., facing an unwanted pregnancy). Failing to do so sets up a false comparison and ignores the reality of women's lives—once a woman is faced with an unwanted pregnancy, or one she feels financially, emotionally, or physically unable to cope with, she has few options.

In this article we evaluated the research literature on induced abortion and mental health with regard to two issues: (a) the relative mental health risks associated with abortion compared with the risks associated with its real alternatives and (b) sources of individual variability in women's psychological responses following abortion. We reviewed empirical papers published from 1989 through 2008 in peer-reviewed journals that either compared women who had an abortion with a comparison group of women or examined predictors of mental health among women in the United States who had had an abortion. Our review is based substantially on and updates the task force report received by APA in August 2008 (APA TFMHA, 2008).

We reviewed four major perspectives that shape the literature on abortion and mental health. These include the perspectives that (a) abortion is a uniquely traumatic experience; (b) unwanted pregnancy and abortion are potentially stressful life events, responses to which are shaped by women's appraisals and coping resources; (c) psychological reactions to abortion are shaped by the sociocultural context in which abortion occurs; and (d) unwanted pregnancy and abortion occur in the context of co-occurring risks that are themselves predictive of poorer mental health irrespective of pregnancy resolution. With the exception of the first one, these perspectives are complementary, emphasizing different factors that may lead to negative or positive psychological reactions following termination of a pregnancy. Only the first perspective predicts that most, if not all, women will experience negative psychological reactions following an abortion.

Our review revealed that major methodological problems pervade most of the literature on abortion and mental health. These include (a) use of inappropriate comparison or contrast groups; (b) inadequate control for co-occurring risk factors/potential confounders; (c) sampling bias; (d) inadequate measurement of reproductive history, under-specification of abortion context, and problems associated with underreporting; (e) attrition; (f) poor measurement of mental health outcomes and failure to consider clinical significance; (g) statistical errors; and (h) interpretational errors. All of the studies reviewed suffered from one or

more of these methodological problems, some more so than others.

One basis on which to draw conclusions from this literature would be to simply calculate effect sizes or count the number of published papers that suggest adverse effects of abortion and those that show no adverse effects (or even positive effects) of abortion when compared with an alternative course of action (e.g., delivery). We believe that such an approach would be misleading and irresponsible given the numerous methodological problems that characterize this literature, the many papers that were based on the same data sets, and the inadequacy of the comparison groups typically used. We based our conclusions on the entire body of literature reviewed, emphasizing the most methodologically rigorous studies.

The strongest comparison-group studies based on U.S. samples found no differences in the mental health of women who terminated a single unintended pregnancy compared with other groups of women once confounders were controlled. The strongest studies based on non-U.S. samples reported mixed conclusions, with some reporting small but statistically significant effects in the direction of poorer mental health among women who had one or more abortions compared with a comparison group or groups, and others reporting no differences. We believe that several important methodological and design factors account for the differing conclusions reached by these studies.

The first, and perhaps most important, of these is the nature of the comparison group used—whether a study compared women who terminated a pregnancy with women who delivered *an unwanted pregnancy* or with some other group (e.g., women who delivered, women who had not been pregnant). As noted previously, controlling for the wantedness of a pregnancy is essential to determine the relative risks associated with abortion compared to its real alternatives.

Second, studies differed in the extent to which they controlled for known co-occurring risks, such as prior exposure to physical or sexual violence and abuse. As reviewed previously, violence and abuse are more frequent in the lives of women who have unwanted pregnancies and abortions and are important predictors of mental health problems among women. Few studies controlled for these risk factors. Several studies found that differences between abortion samples and comparison group(s) became statistically nonsignificant once differences between groups in exposure to violence or abuse were controlled (e.g., Russo & Denious, 1998a; Taft & Watson, 2008). Controlling for number of prior abortions and number of prior births also is important, as there is some evidence that greater numbers of abortions and greater numbers of live births are associated with increased risk of mental health problems (Harlow et al., 2004; Taft & Watson, 2008). Studies that do not separately examine mental health among women who have one versus multiple abortions may inflate risks associated with a single abortion.

Third, studies also differed with respect to the age, size, and location of samples, leading to differences in generalizability. Some studies were based exclusively on

young women (e.g., Dingle et al., 2008; Fergusson et al., 2006; Pedersen, 2007, 2008), whereas others were not (e.g., Gilchrist et al., 1995). The former may not generalize to older samples. Women who terminate a pregnancy at younger ages may be at somewhat higher risk for mental health problems than women who terminate a pregnancy at a later age (Major et al., 2000), although as a group, minors (<age 18) do not appear to be at greater risk than adult women (Quinton et al., 2001). Number of women in the abortion sample also varied considerably across studies, with sample sizes ranging from less than 50 in some cases (e.g., Fergusson et al., 2006) to more than 6,400 women in others (Gilchrist et al., 1995). Findings based on small samples are generally less reliable than those based on larger samples, especially when large numbers of potential confounders are controlled for in the analyses. The socio-cultural context in which the abortion occurred also must be considered. For example, in countries such as the United Kingdom, New Zealand, and in southern Australia, women must obtain permission from two physicians before they are allowed to obtain an abortion. The differing social context and laws regulating abortion across countries make it problematic to generalize from non-U.S. samples to the United States.

Finally, it is important to consider differences in method of assessing abortion history across studies. Studies in which abortion history was assessed through retrospective self-reports are subject to a variety of reporting biases, such as recall bias, to which studies in which abortion was verified through physician or clinic records are not. As noted earlier, there is reason to believe that women who are willing to report an abortion on a survey may also be more willing to report other types of problems, such as substance use.

Conclusions

Taking all of the above factors into consideration, we came to the following conclusions from our review and evaluation of the literature:

First, the relative risk of mental health problems among adult women who have a single, legal, first-trimester abortion of an unwanted pregnancy for nontherapeutic reasons is no greater than the risk among women who deliver an unwanted pregnancy. This conclusion is generally consistent with that reached by the first APA task force on mental health and abortion (Adler et al., 1990), as well as with a recent review of the literature by Charles, Polis, Sridhara, and Blum (2008).

Second, the relative risk of mental health problems among women who terminate a wanted pregnancy because of fetal abnormality appears to be similar to (and no greater than) that of women who miscarry a wanted pregnancy or experience a stillbirth or the death of a newborn.

Third, the relative risk of mental health problems among young women in New Zealand, Australia, and Norway appears to be slightly but significantly higher if they report one or more abortions than if they report no abortions, delivering a baby, or no pregnancies. It is unclear to what extent these findings may be linked to the young age

of these samples, the social context in which abortion occurred, the fact that abortion was measured through self-report rather than verified, or the failure of any of these studies to adequately assess whether a pregnancy was wanted.

Fourth, the claim that observed associations between abortion history and a mental health problem are *caused by* the abortion per se, as opposed to other factors, is not supported by the existing evidence. As observed throughout this article, unwanted pregnancy and abortion are correlated with preexisting and co-occurring conditions, life circumstances, problem behaviors, and personality characteristics that can have profound and long-lasting negative effects on mental health irrespective of how a pregnancy is resolved. Although several recent studies have attempted to control for many of these factors, it is often impossible to control sufficiently for all of them.

Fifth, the majority of adult women who terminate a pregnancy do not experience mental health problems. Across studies, the prevalence of disorders among women who terminated a pregnancy was low, and most women reported being satisfied with their decision to abort both one month and two years postabortion (Major et al., 2000).

Sixth, although we conclude that most adult women do not have mental health problems following an abortion of an unwanted pregnancy, we do not mean to imply that no women experience such problems. Some women do. Abortion is an experience often hallmarked by ambivalence, and a mix of positive and negative emotions is to be expected (Adler et al., 1990; Dagg, 1991). Some women feel confident they made the right choice and feel no regret; others experience sadness, grief, guilt, and feelings of loss following the elective termination of a pregnancy. Some women experience clinically significant outcomes, such as depression or anxiety. It is important that all women's experiences be recognized as valid and that women feel free to express their thoughts and feelings about their abortion regardless of whether those thoughts and feelings are positive or negative.

Understanding the source of variation in women's psychological responses is an important research agenda. Factors shown to be predictive of more negative psychological responses following first-trimester abortion among women in the United States include the extent to which a woman wanted and felt committed to her pregnancy, perceptions of stigma and associated perceived need for secrecy surrounding abortion, low perceived self-efficacy for coping with the abortion, low actual or anticipated social support for the abortion decision, and use of avoidance and denial coping strategies. A history of mental health problems prior to pregnancy emerged as the strongest predictor of postabortion mental health. It is important to note that many of these same factors also are predictive of negative psychological reactions to other types of stressful life events, including childbirth, and hence are not uniquely predictive of psychological responses following abortion.

A cautionary note. The relationship between abortion and mental health is a highly contested issue. Some have claimed that a (presumed) negative relationship

between abortion and mental health is a reason to make abortion less accessible. This argument is based on the reasoning that if abortion and a mental health problem (e.g., substance abuse) are related, then reducing access to abortion would reduce the prevalence of that problem. We would like to caution the reader against falling prey to this example of the "interventionist fallacy." The interventionist fallacy results from the belief that if a relationship is currently observed between two variables, the form or magnitude of the relationship will remain unchanged if an intervention is instituted—for instance if the availability of abortion were to be dramatically reduced. As applied to the case of abortion, this reasoning (that if the number of abortions were to decrease, then there would be a proportional decrease in mental health problems) is flawed. One consequence of such an intervention would be that the characteristics of the population of women who delivered children would change. Characteristics previously more prevalent among women who have abortions (e.g., greater poverty, problem behaviors, exposure to violence) would now be more prevalent among women who deliver. Note that this potential change in the profile of women giving birth may include new mental health problems that might develop from stresses associated with raising a child a woman feels unable to care for or may not want or from relinquishing a child for adoption. Thus, reducing access to abortion could result in poorer mental health among the population of women who deliver. Hence, rather than reducing the prevalence of mental health problems among women, this intervention could potentially increase it.

Concluding comments. Mental health among women who experience an unwanted pregnancy reflects a number of factors. It reflects preexisting and co-occurring conditions in a woman's life that place her at greater or lesser risk for poor mental health in general regardless of how she resolves her pregnancy. It reflects her appraisals of the meaning of a pregnancy and abortion and her appraisals of her ability to cope with either option. It also reflects the coping strategies that she employs to deal with emotions she may experience as a result of her decision. The local and larger sociocultural contexts in which a woman lives also affect her mental health following an abortion. Perceived social stigma surrounding either continuing a pregnancy (e.g., in the case of an unwed teenager) or having an abortion can influence the decisions that women make, how they feel about their decisions, and how they cope with their feelings. Important agendas for future research are to further understand and alleviate the conditions that lead to unwanted pregnancy and abortion and to understand the conditions that shape how women respond to these life events, with the ultimate goal of improving women's lives and well-being.

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